

First Copy AUGUST, 1939
AUG 11 - 1939

The TOOL ENGINEER


A Distinguished Line

New Britain Automatics —
Built to Stay accurate—Sturdy
construction for the toughest
jobs — Entirely open end con-
struction on chucks for tool-
ing accessibility — Many other
exclusive features for Permanent
Accuracy.

New Britain Engineered means
Profit Engineered.

Machine Tool Show, Space No. 5202
Cleveland, October 4-13, 1939

NEW BRITAIN-GRIDLEY
MACHINE DIVISION • THE NEW BRITAIN MACHINE CO.
NEW BRITAIN • CONNECTICUT



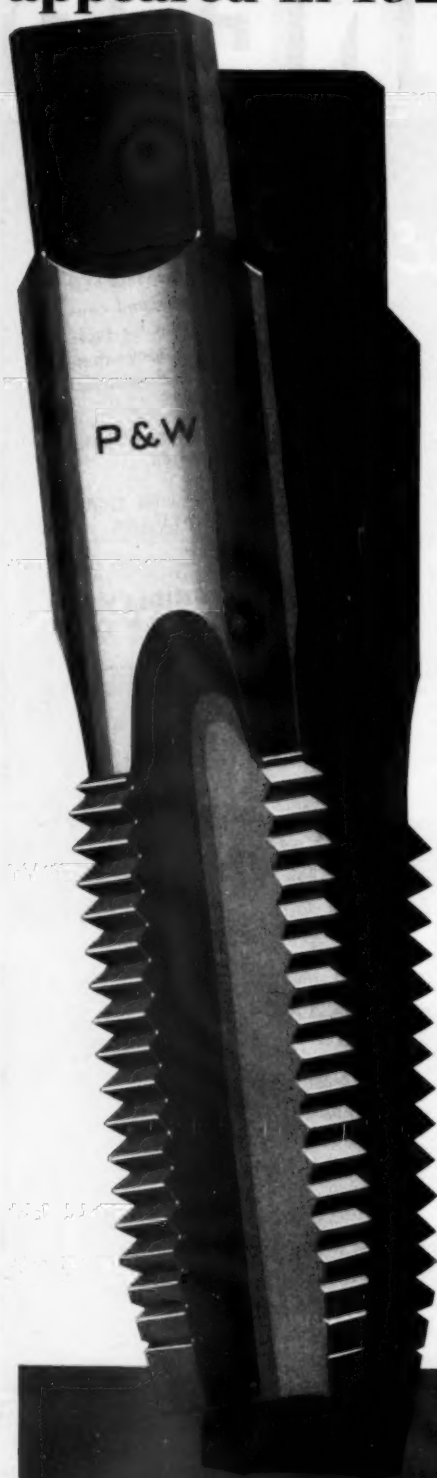
MODEL 86
Eight Spindles
6 $\frac{3}{4}$ -inch Chucks
Open End
Construction
Swinging Type
Forming Arms

A complete line of Chucks — Four, Six and Eight Spindles to 10 $\frac{3}{8}$ " Capacity
Also a complete line of Screw Machines — Four and Six Spindles to 2 $\frac{1}{4}$ " Capacity

Official Publication of the

AMERICAN SOCIETY OF TOOL ENGINEERS

**This True Story
about P&W Taps
appeared in 1927**



There were no * * * * in the letter to *Jimmy*

Recently we sent some taps to a prominent nut and bolt company in Detroit. It happened that the test of some of these taps against others was run at night. Whereupon our Detroit office received the following communication:

"In testing out the special taps which you left with me, the results on one in particular is quite interesting. As witness, the following verbatim note our night operator left for Jimmy

'Jimmy:

*That tap that was in No. 6 run all those nuts out and I put it in No. 3 and d***** if it isn't still going to beat b****. If they'd order some taps like that they wouldn't have to get them by the arm loads. I broke about a half dozen of those other taps before midnight in No. 3. They're not worth a d*** — won't stand up.'*

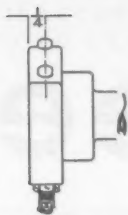
"I have this tap with a few of the nuts produced thereon on my desk which I will be glad to let you have to show your friends in Hartford."

Is it any wonder that the operator's enthusiasm sought emphatic language for expression?

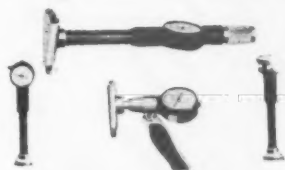
Since then 12 more years of constant research and progress have contributed to P&W Tap quality and performance!

PRATT & WHITNEY

Division Niles-Bement-Pond Co., Hartford, Conn.



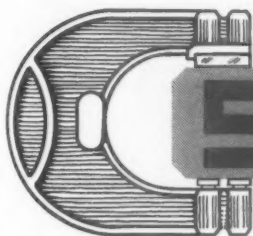
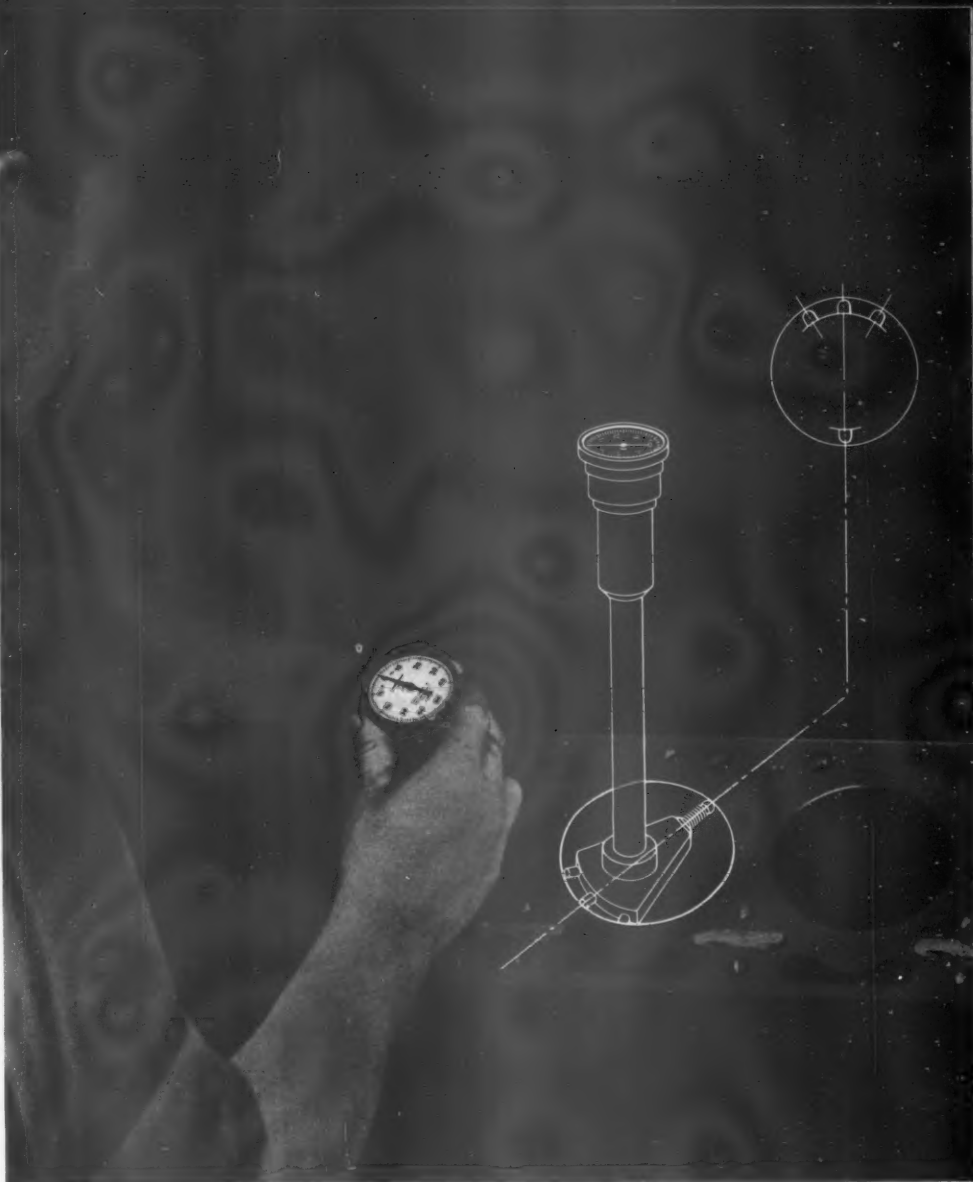
Since centralizing plungers and measuring points are in the same plane, any shallow bore may be gaged.



Four types available. Standard; Vertical; Vertical 90°; Pistol-Grip.



Only one adjustment—"A" Centralizing plungers "CP" expand and contract automatically. Measuring point "B" actuates the dial hand.



STANDARD

HERE is an inspector's-eye view of the STANDARD Dial Bore Gage. Instead of "feel" there is a definite dial indication. It removes the element of human error from one of the most important of all checking operations.

Measurements are taken on the true center-line only, as shown by the diagram. This STANDARD two-point method not only eliminates the three-point mechanical error, but

also permits measurements of the entire depth of open bores and down to within $\frac{1}{4}$ " of the bottom of closed bores.

Only one set screw adjustment when setting up for a new size. STANDARD Dial Bore Gages are available in four types: Standard; Vertical; Ninety-Degree; and Pistol-Grip.

Full details upon request.

STANDARD GAGE CO., INC.
80 PARKER AVE. Poughkeepsie, N. Y.

GAGES

The Tool Engineer

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in U.S. Pat. Off.

Official Publication of the AMERICAN SOCIETY OF TOOL ENGINEERS

Vol. VIII

AUGUST, 1939

No. 4

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Incorporated. The membership of the Society and readers of this publication are practical manufacturing executives such as master mechanics, works managers, Tool Engineers, tool designers and others who are responsible for production in mass manufacturing plants throughout the nation and in some foreign countries.

Owing to the nature of the American Society of Tool Engineers, a technical organization, it cannot, nor can the publishers be responsible for statements appearing in this publication either as papers presented at its meetings or the discussion of such papers printed herein.

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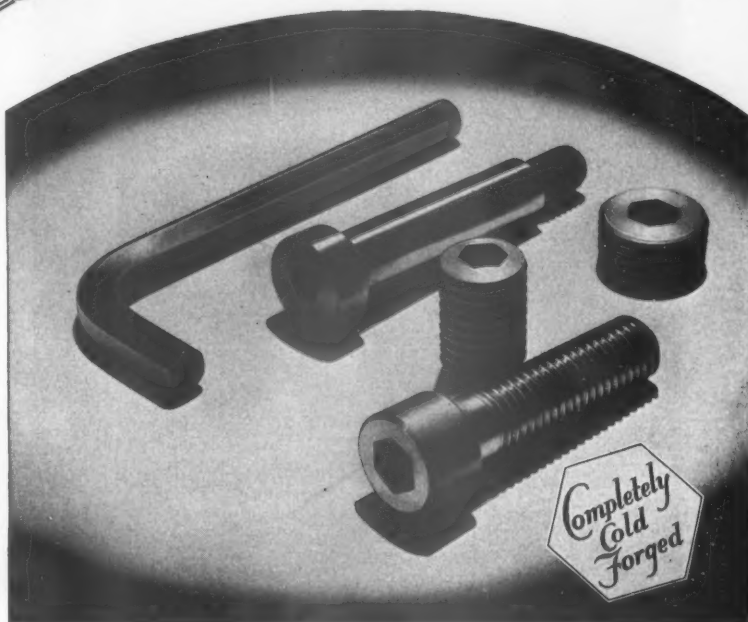
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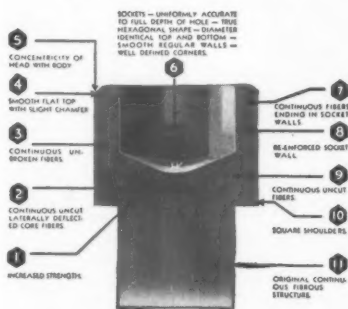
THE TOOL ENGINEER FOR AUGUST, 1939

THE RESULTS OF A NEW
MANUFACTURING METHOD
PATENTED BY HOLO-KROME

UNFAILING PERFORMANCE



the Real Test of Quality



TEST OFFER

Enough Screws for an adequate Test
gladly sent—give style, size, thread, etc.

SCREWS FREE

Holo-Krome FIBRO FORGED Socket Screws constantly prove their Quality, inside and out, in the most exacting tests repeatedly being made by Socket Screw Users.

Each Test emphasizes this well known fact—that Holo-Krome Quality does give Unfailing Performance.

You may have a particular kind of a Test you would like to make—why not do it! You too, we guarantee, will find the same result—Unfailing Performance. Make use of our Test Offer, today.

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KROME

HARTFORD, CONN., U.S.A.



PRECISION TOOL ROOM LATHE



PRECISION HAND SCREW MACHINE

MACHINES ILLUSTRATED HAVE PRELOADED BALL BEARING SPINDLE CONSTRUCTION AND 1" CAPACITY THROUGH THE COLLET

For years, Hardinge Brothers, Inc. have pioneered the logic of using Small Machines for Small Work. This good planning has been accepted by Manufacturing Organizations and, lately, by other Machine Tool Builders.

With our Correctly Designed and Engineered Machines for Small Precision Work, we have set a new Standard for Accuracy, Speed in Operation and Desired Results.

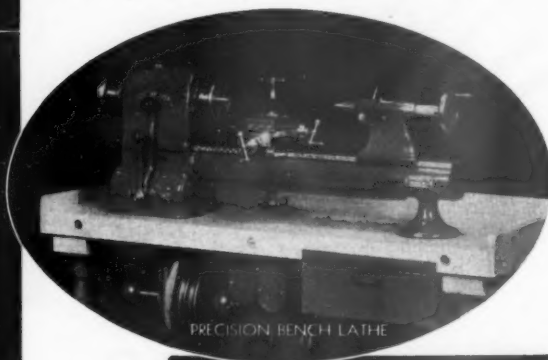
Investigate the possibility of the machines illustrated in this advertisement by asking for Complete Illustrated Bulletins.

HARDINGE BROTHERS, INC., ELMIRA, N. Y.
CHICAGO - NEW YORK - PHILADELPHIA - DETROIT - HARTFORD

Follow THIS TREND SET BY HARDINGE

The Machine to be in Correct Relation to the Work. The fact that Large and Expensive Machines cannot compete with Small Machines for Small Work.

Planned Companionship and Interchangeability of Attachments between a Bench Lathe, Tool-Room Lathe, Hand Screw Machine and Milling Machine.

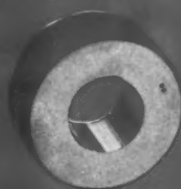


PRECISION BENCH LATHE



PRECISION MILLING MACHINE

Typical Jobs Handled on the Sunnen Model "MA" Precision Honing Machine



Hardened Steel Ring Gears



Hydraulic Cylinder for Automatic Machinery



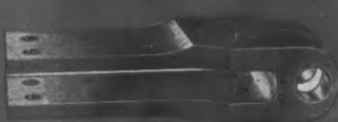
Aviation Hydraulic Cylinder



Hardened Steel Inner Bearing Race



Machined Composition Pulleys



Mild Steel Clevis



Diesel Engine Fuel Injector Cylinder

Solves 5 Problems for the Tool Engineer



Corrects out-of-roundness and taper.



Accurately finishes the internal surface of holes to .0001" limit for roundness and straightness.



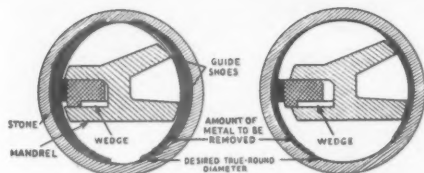
Facilitates the duplication of sizes.



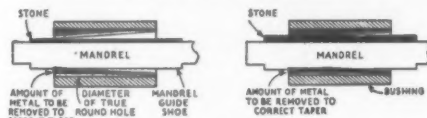
Produces a super-smooth finish.



Provides a simple, low cost, production method.



Corrects Out-of-Roundness



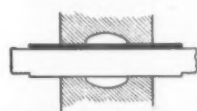
Corrects Taper



Corrects Wave



Corrects Rainbow



Maintains Alignment



Super Finish

In hundreds of plants the Sunnen Precision Honing Machine is solving these five problems. It is simple to operate. Can be set up and work located in less than a minute. Dial micrometer stop prevents going oversize. The sketches at left show how the rotating mandrel with its expanding stone solves internal finishing problems.

Wide Range! The Sunnen Precision Honing Machine handles any straight, round, internal cylindrical surface free from full length key-way from .245" to 2.400" and up to 7" in length with a guaranteed accuracy of .0001"—providing positive alignment.

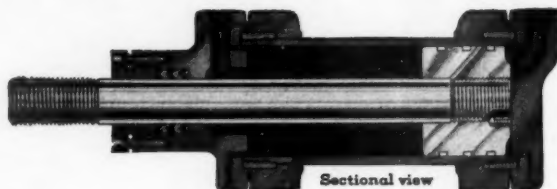
Ideally suited for Assembly Operations, Repairs and Salvage Work, Production Work, Tool Room and Experimental Work and for the Job Shop.

Write for new 8-page bulletin T-8 giving complete information.

SUNNEN

Sunnen Products Co., 8002 Manchester Avenue, St. Louis, Mo.

STRONGER, SIMPLER HYDRAULIC CYLINDERS



Sectional view

*Easier
to use*

The advantages of high efficiency hydraulic power are combined with strong, simple construction in Hannifin Hydraulic Cylinders. This patented design greatly simplifies application, presents a better appearance, and is adaptable to any type of use. Get the maximum advantages of hydraulic power with its simplicity, ease of control, and wide range of power movement, by using Series "N" Hannifin Cylinders.

NO TIE RODS. This simpler design is stronger, and eliminates a source of leakage. End caps may be removed without collapse of other parts of the assembly.

UNIVERSAL CAPS. Either end cap may be positioned independently, so that inlet port is at top, bottom, or either side. Either cap may be moved without disturbing the cylinder mounting or other parts.

AIR VENT PLUGS. Each end cap has air vents on three sides. With the inlet port at either side or bottom there is always an air vent plug at the top.

LEAK-PROOF. Special mirror finish honing produces a cylinder bore that is straight, round, perfectly smooth, and concentric with the end caps. A perfect piston seal is obtained.

MANY TYPES AND SIZES. Available in six standard mounting types, with small diameter piston rod, 2 to 1 differential piston rod, or double end piston rod, in all sizes, for working pressures up to 1000 and 1500 lbs./sq. in. Other types built to order. Write for Bulletin 35 with complete data.

HANNIFIN MFG. COMPANY

621-631 South Kolmar Avenue, Chicago, Illinois

Detroit Representative: R. A. Bean, Hayward Building,
4829 Woodward Ave. Telephone Columbia 4949



Model GN



Model GN



Model EN



Model EN

Other mountings available

ENGINEERS • DESIGNERS • MANUFACTURERS • PNEUMATIC AND HYDRAULIC PRODUCTION TOOL EQUIPMENT

HANNIFIN

HYDRAULIC CYLINDERS

Leaders Must Lead

AN EDITORIAL

by

A. E. RYLANDER

ASSUME that an observer stands on a prominence, around the base of which curves a single railroad track. If, standing there, he sees two trains approaching each other, it is a foregone conclusion that there will be a collision unless Providence intervenes or design of man averts disaster. The design may be a signal, or the observer may flag the trains. If he cannot prevent the accident he is an innocent witness, but if he can, and doesn't, then he is morally responsible for what happens.

Analogous to this, it is a question, with certain manifestations in the industrial world portending equally certain results, whether or not we are innocent or morally responsible for the consequences. Let us view the situation. For many years Tool Engineers have been designing the tools of manufacture, although the title itself is a term initiated by the A.S.T.E. For an equal number of years, if not more, skilled mechanics—machinists, tool, die, gage and instrument makers—have made the tools. Many of our leading Tool Engineers were graduated from this school of practical experience, intelligent men, entirely capable of construction from drawings or, plans lacking, improvising from sketches or mental concept.

That school is dying out, and its passing forebodes disaster, not only for the Tool Engineers but for industry as a whole. Certainly if we cannot find men to build tools there will be no object in designing them; the drawing is but a means to an end, not an end in itself. The past year has been particularly trying, spoilage and stoppage of tool work not only entailing an inordinate expense, but seriously delaying production of new models, especially in the automotive field. This, in turn, delays reemployment of production hands laid off during the changeover, seriously affects all business and industry. Signs of fear are reflected in the real estate business; at a time when a legion of potential home owners should be building we have a buyers' market, which is quite the reverse of good business. Reduced to essentials, the situation in the tool game threatens the economic structure of the nation.

Skilled mechanics are quitting the tool rooms in disgust; the most who remain are men in middle life or advancing years, without enough new blood coming in to maintain a balance. The comparatively few concerns that train apprentices do so with a view toward their own future needs. The question is, can we do anything about it, and if we can, will we? The answer is that we must! Taking the positive alternative, consider that the tool room—be it the jobbing shop or a department in a manufacturing plant—is the very foundation of our industrial scheme. Without tools, we cannot produce on a modern scale; the natural corollary is, then, that for our own economic salvation we must interject ourselves into the problem, must present a solution. We shape the industrial future, or it shapes us.

This Society has taken a definite lead in the technical field, includes serious thinkers and able executives. Leaders must continue to lead, having once taken the initiative; now, industry headed for a morass, we must lead the way to firmer ground. Some one body is going to do it; let it be a body of Tool Engineers! Few are so vitally interested, few so eminently qualified to analyze the situation and propose a workable solution. Then, too, we have an advantage of growing strength, of wisdom engendered of experience; the mountains that loomed in prospect are being reduced to mere hills as we forge ahead. Here, editorially, we present a problem, knowing that it will evoke responsive action, even as previous editorials on the Machine inspired the A.S.T.E. Fact Finding Committee. Well, here are vital facts that bear on our very existence, and they must be considered. We are leaders, and leaders must lead!



HERE'S A TIP ON A TAP

A certain Detroit manufacturer felt pretty low about his costs on Diesel engine crankshafts. The reason: the special steel used was hard on a certain hand tapping operation—so hard that 30 holes per tap was a record. Worse—the taps frequently broke in the hole and completely ruined an expensive shaft.

When a "Greenfield" engineer analyzed the job he recommended a precision ground tap with six flutes instead of four and specially chamfered and hooked for hand tapping. Result—62 holes—and after resharpening the tap was as good as new.

From 30 to 62 holes per tap doesn't sound very exciting until you stop to realize it means over 105% increase. Then it sounds different. So here's the tip—Just because a job isn't "production" don't neglect to get expert advice. It can save you real money.

Greenfield Tap & Die Corporation, Greenfield, Mass.

Detroit Plant: 2102 West Fort St.
Warehouses in New York, Chicago, Los Angeles and San Francisco
In Canada: Greenfield Tap & Die Corp. of Canada, Ltd., Galt, Ontario

GREENFIELD





Scenes like this from the 1935 Machine Tool Show will be duplicated many times over when thousands of executives from every branch of the metal working industries flock to Cleveland in October for the 1939 exhibit. Machines will take six-and-one-half acres of display space, every available square foot of Cleveland's mammoth Public Auditorium.

Tool Engineers Head for Cleveland

October 5th, 6th and 7th

THE 1939 Machine Tool Show to be held in Cleveland October 4 to 13, and the Semi-Annual Meeting of the American Society of Tool Engineers to be held at the Hotel Statler Cleveland October 5 and 6, are two important reasons why Tool Engineers will head for Cleveland in early October.

In the number and range of exhibits and in improvements in performance and design of machine tools, this year's Machine Tool Show is expected to far surpass the last show held in 1935.

Cleveland's \$15,000,000 public auditorium containing over six acres of exhibition space will house the 1939 show. Eighty-five per cent of the exhibit space will be devoted exclusively to the showing of machine tools, while the balance of space will contain displays of makers of machine tool accessories, etc.

The remarkable interest in this year's Show is evidenced by the fact that all of the available exhibit space has been oversubscribed, and original requests for exhibit space have had to be cut in order to hold the total booth space within available limits.

Thousands of machines will be exhibited, their value running into the millions. To provide the power required to operate these machines, special power lines will be installed carrying an 8500 horsepower connected load. Manufacturers from all over the United States and from many foreign countries are expected to visit the Show. Admission will be by registration, with registration fee at \$1.00.

"The purpose of this Show is to place



Wendell E. Whipp, President of The National Machine Tool Builders Association, and President of The Monarch Machine Tool Co. of Sidney, Ohio.

under one roof for convenient inspection and study, the finest and most modern machine tool equipment from every branch of the machine tool industry," says Wendell E. Whipp, president of the National Machine Tool Builders Association. "The last four years have shown substantial advances

in the art of machine tool building—advances which mean reduced production costs, increased productivity per dollar invested, and greater potential profits. Visiting manufacturers and Tool Engineers will have ample opportunity to see various machines in operation, to ask questions, and to determine just what tools will be most effective in solving production problems.

"This year's Show is purely a business proposition. Registration fee is charged mainly to insure that attendance will be confined to people who have a direct dollars-and-cents interest in better machine tool equipment. Rules governing displays have been worked out with a view toward maximum visibility and a minimum of crowding."

Technical Organizations Participate

In connection with the Machine Tool Show there will be a series of evening meetings sponsored by the Machine Tool Congress which will be open to all attending the Show. Organizations participating in the Machine Tool Congress are: the American Society of Tool Engineers, National Electrical Manufacturers Association, Society of Automotive Engineers, American Foundrymen's Association, Inc., American Society of Mechanical Engineers, Associated Machine Tool Dealers, Cleveland Engineering Society, National Foremen's Association and the National Machine Tool Builders Association. Speakers at these meetings will include outstanding industrialists and engineers.

The schedule of programs of the or-

ganizations participating in the machine Tool Congress, has now been completed, it is reported by A. C. Danekind of the General Electric Company, who is president of the Congress. The schedule is as follows:

Wednesday, October 4th

National Electric Manufacturers Association, Hotel Cleveland Ball Room 8:00 P.M.

Thursday, October 5th

American Society of Mechanical Engineers, Machine Shop Practice Division, Hotel Cleveland Ball Room, 8:00 P.M.

American Society of Tool Engineers, Inc., Cleveland Engineering Society quarters Guild Hall, 8:00 P.M.

General Electric Institute open house program and lighting demonstration, Nela Park, 7:30 to 10:00 P.M.

Friday, October 6th

American Society of Tool Engineers, Inc., dinner meeting, Hotel Statler Ball Room, 6:30 P.M.

National Association of Foremen, Music Hall, Cleveland Public Auditorium, 8:00 P.M.

Monday, October 9th

American Foundrymen's Association, Inc., dinner meeting, Hotel Hollenden Ball Room, 6:30 P.M.; symposium on castings, Hotel Hollenden Ball Room, 8:00 P.M.

Associated Machine Tool Dealers of America, dinner meeting, Hotel Cleveland Ball Room, 6:30 P.M.

Tuesday, October 10th

Cleveland Engineering Society, Machine Design Division, Music Hall, Cleveland Public Auditorium, 8:00 P.M.

Wednesday, October 11th

Society of Automotive Engineers, Inc., dinner meeting, Hotel Cleveland Ball Room, 6:30 P.M.

Thursday, October 12th

General Electric Institute dinner meeting and lighting demonstration, Nela Park, 6:30 P.M.

Several of the detailed programs are being currently announced, Danekind said, and others are expected to be ready shortly.



JOHN M. YOUNGER

Professor at Ohio State University, Chairman A.S.T.E. Fact-Finding Committee on "Effect of Machines on Employment and Standards of Living" who will give his second report at Preview dinner.

A.S.T.E. Program Announced

The American Society of Tool Engineers will occupy the center of the Machine Tool Congress stage on the evenings of October 5th and 6th. These programs, coincident with the National Semi-Annual Meeting for members of the American Society of Tool Engineers, are as follows:

Thursday, October 5th

Cleveland Engineering Society quarters, Guild Hall, 8:00 P.M.

Chairman: G. J. Hawkey, Chairman, Cleveland Chapter A.S.T.E.

"Application and use of Anti-Friction Bearings as Applied to Machine Tools," Stanley R. Thomas, Chief Engineer, Bantam Bearings Corporation, South Bend, Indiana.

"Application and Use of Plain Bearings as Applied to Machine Tools," Eugene Bouton, Supv. Time Study, J. I. Case Tractor Works, Racine, Wisconsin.

"Bearings—Their Use and Misuse," Karl L. Herrmann, Engineer, South Bend, Indiana.

Friday, October 6th

Dinner meeting, Hotel Statler Ball Room, 6:30 P.M.

Chairman: James R. Weaver, President A.S.T.E.

Second Report of Fact Finding Committee on "Effect of the Development of the Machine on Employment and Our Standard of Living," John R. Younger, Professor, Dept. of Industrial Engineering, Ohio State University; Chairman of A.S.T.E. Fact Finding Committee.

"Economic and Political Effect of the Development of the Machine," Hon. Hamilton Fish, United States Congressman from New York.

The highlight of the technical sessions to be held on October 6th, a dinner meeting at the Hotel Statler Ball Room at 6:30, will be the second report of the Fact Finding Committee by John R. Younger, Professor, Industrial Engineering, Ohio State University, honorary member of A.S.T.E. and Chairman of the A.S.T.E. Fact Finding Committee. Widespread interest has already been shown in the results of this committee's work and an unusually large attendance of both A.S.T.E. members, as well as others attending the Show is anticipated.

24th Anniversary Celebrated by Tool Engineers

WHAT happens to a Tool Engineer in a decade or two? How has he fared? What does he look like? How is he faring now? These, and other questions of human interest were answered at a recent meeting of some of the old timers.

June the eighth, twenty years ago this summer a group of forty Tool Engineers were sent by Cadillac Motor Car Company to The American Ball Axle plant in Cleveland to tool up the Cadillac axles for production there. As much water has run under the bridge since then it occurred to a number of these men that many of the boys are still in town and that a reunion would be interesting, instructive and enjoyable. It proved to be all of this beyond expectation.

A committee composed of N. J. Martin, Charles Roush, Ray Farmer and the writer set to work to round up the gang, and this was the beginning of the fun. Twenty-one were located in the Detroit area while the balance were scattered

By

JOHN A. MARKSTRUM

MEMBER A.S.T.E.

literally from coast to coast. One was found in Hollywood, the last place on earth one would expect to find a Tool Engineer. No sir, he is not an actor. Tool Engineers are bad actors and too practical for make-believe. R. L. Owen is one of the head engineers for Warner Brothers, and sent his greetings to all his friends. L. Freeman is in the Ordnance Department on the Atlantic Coast. Others were located throughout the country. Only one is still employed at Cadillac. Many of the boys are A.S.T.E. members of the Detroit and other chapters.

The outstanding part is that only two of the forty are known to have passed to the great beyond in a fifth of a century which refutes life insurance statistics. Are Tool Engineers made out of superior clay, do they live by their

wits as claimed, do they work so furiously that they forget to die, or are they dead and fail to lie down? Either way it is a record for any other profession or group to shoot at.

Green Lake Country Club was our place of meeting, the date June 11. Twelve men appeared for a tasty dinner, namely N. J. Martin, R. H. Farmer, A. Kusic, D. W. Kerr, J. A. Markstrum, F. G. Nagel, C. Roush, F. V. Smith, A. T. Stone, C. H. Clise, F. C. Braus, F. B. Markle.

Most of these men did not look much older than they did in Cleveland. All were working, many on overtime. They reported their pay as about double that of 1919. Two have graduated into the elevated position of salesmen. One is chief engineer. Out of the forty, as far as we could learn, eleven are still on the board. The consensus of opinion was that during the lean years we have just passed (we hope) very few new tool designers have been developed,

(Continued on Page 49)

Lost Motion

in

DIE DESIGN

By
JAY BOWEN
ENGINEER
McREYNOLDS DIE & TOOL COMPANY

IN producing working drawings for the die shop, it seems that the average die engineering department or engineering firm does not complete the job or goes to the opposite extreme; either way the sins of omission are as great as those of commission.

The designer who is too profuse with dimensions is usually a greater offender than the one who uses them too sparingly. A good diemaker is seldom at loss to supply his own dimensions and there are cases where he can save time and effort if not confined to an arbitrary figure which is purely a figment of the draftsman's imagination. I have in mind instances where the dimension for the length of every section had been given and the diemaker, assuming the design as absolute authority, spent unnecessary hours joining them at the precise spot indicated. If these dimensions had been left off the drawing he could have speeded the job by fitting the sections into place allowing location of joints to vary as much as $\frac{1}{16} \pm$ according to steel provided by bill of material.

There are numerous cases where dies can be designed and detailed to the nth degree, and to great advantage. For instance, in the design of dies used in the heavy production of mechanical parts such as brake drums, shields, housings and most of the parts that go to constitute the chassis of an automobile. On the other hand, on most die work where odd shaped parts are produced such as panel stampings for automobile bodies, ice boxes and stoves, too much detail in design is an absolute detriment to the diemaker.

In producing designs for the parts latterly referred to, it has been my experience that the essential dimensions are those for castings only and to the extent of plane surfaces only, such as outside or overall dimensions, shut heights, seats for inserts, heels or wear plates and starting or setup dimensions for location and position of the part to be made.

In the case of dies with cam motions incorporated, the slides, drivers, wear plates, gibs, etc., should be thoroughly detailed.

In no case should the length of sections be dimensioned, as shown in a preceding paragraph such dimensions tie the diemaker to limits and cause a great deal of extra work.

The average die leader is quite a practical sheet metal engineer in his own right and can be depended on to put enough screws and dowels in and in the right place, and to locate section joints in the most practical manner. Tying him up with unnecessary dimensions causes a lot of wasted effort in layout and working to scratch, whereas if he is left free to use his own judgment—and most of them have a fair amount, he will carry his work through much faster and just as well.

Another thing, the die designer should be very alert in the use of standard products in his designs, consulting the catalogs of the various suppliers frequently and never, if possible, deviating from them. I refer especially to the listing of screws, dowels, shoulder screws and springs. Much grief can be caused in the shop when the blue prints reach there with such items listed as cap screws over 6 inches long. An instance came to my attention recently of a listing of oval wire die springs 2 inches in diameter by 13 inches long.

In rare instances it is necessary to use bastard spring screws or dowels and it should be called for as special and material listed to make it. In most cases a little head work and revamping obviates any need to use such parts. In so doing the designer may get rid of a lot of grief and delay on a production period whereby broken parts are quickly replaced from stock and the job running again with a minimum of delay. Otherwise, during an evening when he is enjoying a movie or mystery story, he may feel his ears tingle, some night production superintendent or the operator who is being sent home long before his shift is over, is speaking his mind in lurid oratory about the dumbbell that drew the thing up.

Finally he should provide a bill of material that reflects all the brain power and experience, he has had. The trite old phrase "To Suit" is really worked to death. There are excuses for using it, but in most instances a proper amount of stock can be given with little chance of waste, but it is so easy to say "Let George do it," George in this case being the shop. One of the unforgivable sins is to specify cold rolled steel where a piece requires machining otherwise from length. Anyone who has had the slightest bit of shop experience—and most die designers have—knows that the instant the dense outside skin on cold rolled steel is removed the piece takes on a very bowed condition and can cause unlimited work in straightening it. Besides, cold rolled costs quite a bit more than hot rolled. Above all things use the right material in the right place. Give a first class diemaker the proper castings and enough material of the right sort and the idea plus a sample part, a model of some sort or a part print and he will produce a first class workable die with a minimum of effort.

Now, let us get back to the other extreme. There are dies that can and should be built with toolmakers methods to great advantage. These are dies used in extremely heavy production where it is necessary to maintain a supply of replacement parts and possibly duplicate dies, provided of course that the part to be manufactured is adaptable to such methods. Then a set of working drawings with every piece detailed separately and to close tolerances is quite necessary.

The amount of effort and speed with which dies are produced depends greatly on the type and quality of drawings which are sent into the shop, and department heads, checkers and draftsmen should have, at all times, simplicity and practicability uppermost in their thought. Let us endeavor to send designs to the shop that do not have to be redesigned by the men who make them. It can be done and, until it is, we will never stop being referred to as the "damned designer."

DESIGN for Convenience

By
ANDERS JANSSON
MEMBER A.S.T.E.

BACK in the days when the writer wistfully regarded the ads: "Be an engineer and earn \$300 a month," he had been a machine operator among other things and, like many another shopman, had roundly cursed the tool designers for drawing up tools that only a Houdini could operate. Later, taking the ads seriously, he traded the try square and mike for pencils and a drafting kit, set out to revolutionize tool design. One of the first jobs was to design a drill jig which included a clamp screw, and, with bitter memories of sore thumbs, drew in a man sized hand knob. Anarchy!—rank heresy! Had to submit to a redesign and lucky not to get fired. Had it not been for previous shop experience and, truthfully, talent for design if not for drawing, the future Tool Engineer would have died a bornin'.

Well, we use big hand knobs now, having learned that a man's grip on a small screw is more sensitive than a wrench—which the operators used anyway, design regardless—and the boys out in the shop like 'em right well. Today, thanks to a greater consideration of the operator, that hombre quits the day with fingers still limber enough for a bit of orchestral tuning later in the evening. Oh yes, we're still a long way from Utopia, but the modern trend is definitely toward operator convenience. Now, there is nothing particularly altruistic or humanitarian in this trend, but cold, practical design. Operator convenience pays dividends, not only in more output but in satisfied workers, at least as far as handling of tools is concerned. Outside of that, you can't seem to satisfy 'em nohow, these days.

Opinion is still sharply divided on the question whether the operator should sit or stand. The writer believes that, where movement of stock and size of parts permit, the operator should sit, and that factory chairs, rugged enough to stand abuse, and adjustable to the worker, should be provided. An experiment, carried out several years ago, showed an appreciable increase in output when a lathe operator sat, besides reducing spoilage. In that instance, the seat provided was an improvised bicycle saddle, used much after the manner of these rump canes side line athletes use. The idea did not go over because the superintendent claimed that sitting would make mollicoddles out of the operators; the matter of increased output was a minor consideration. It

was okay, of course, for the planer hand to sit.

Actually, standing at many jobs is as fatiguing as marking time in a parade, or, I would imagine, treading circles in a picket line and getting nowhere. Of course, there are exceptions to every rule; the fitter at the bench may well sit at many jobs but is a pain in the neck to the boss if he sits while leaning on a bastard file. The screw machine operator, having a battery to take care of, has to be on his feet; so does the turret lathe operator. But the gear cutter hand can ease his feet once in a while, and so can the milling machine hand. They'll sit or hold up the nearest building column anyway.

It is good design to confine the operator's hands to parts handling rather than to manipulation of tools; the same motion that tightens or loosens a clamp may as well be used to insert and remove work. Some years ago, called to a plant to study the layout for increased production, it was suggested to order several new machines, even though it meant a building extension. However, after watching the operators at work for a day or so, the writer advanced tentative sketches for slight redesigning of existing tools. Where the operators used their hands for clamping, foot pedals were substituted and the operators seated. Inside of a week, the production had jumped 100%, with the operators quite enthusiastic over the change.

On one battery of machines—horizontal drills—the clamps were discarded entirely and a spider substituted for the lever previously used to feed the drills. The jig proper was placed just ahead of the drill head, with a spring pad; the operator inserted the part loosely in what may be termed the tailstock, brought it up to the jig, when further motion tightened it against the spring pad (really a floating bushing plate) and the final travel forced it through the drills. The back stroke of the tailstock ejected the work, which slid down a runway to a box. All the operator had to do was to use his left hand for loading and his right for operating the spider; needless to say, the production jumped considerably. The pro-

posed new building remained a future consideration.

Nowadays, we can take advantage of various accessories, as foot valves and foot switches, gadgets that had to be improvised in the old days. In hydraulic riveting and piercing, for example, the portable C frames commonly used can be set up on pedestals, the operator merely touching a foot switch to bring down the ram. This leaves his hands entirely free to handle the work. With hydraulic tools still in their infancy, we may look forward to quite revolutionary methods of manufacture due to hydraulics. They have the one big advantage of requiring little floor space as compared to presses, which means that larger, but light, parts can be passed over the frames, where it would mean shuttling with a press. Then, too, the hydraulic machines are quiet, a factor in reducing nervousness and soothing quick tempers. With hydraulic riveters inverted, for instance, so that the cylinders are underneath, a lift of only a few inches may be required, which would mean straight line passing of even comparatively heavy parts.

Of course, we need not go the extreme, in efficiency, imputed to one large manufacturer, who not only employed both hands and both feet of a worker, but found that he had a grip left for a broom handle as well. Seriously, however, thought should be given to operator convenience when designing tools, at the same time taking advantage of every means to keep him producing. A poorly designed tool can do a great deal to build up resistance to new ideas, even though the tool itself may be an improvement over previous types. If it is tricky, so that too many motions are required for loading and unloading, or if clamps are inconveniently placed, the operator will condemn the designer along with the tool. But, in the writer's experience—and it is considerable—a tool that is easy to work will be accepted without question, even if the operator senses that it will displace a man or two.

In view of the agitation existent against the machine, it may be of interest that the writer has had very little trouble selling a tool to the operators in the majority of cases, and attributes the reception to the fundamental principle that the operator is a human being endowed with thinking capacity. Some,

(Continued on page 42)

Practical Training in College

By

O. B. PAULSEN

SENIOR M.E., UNIVERSITY OF NEW MEXICO

HAVING read various articles in "The Tool Engineer" regarding practical training of engineers, the following may be of interest.

Although the engineering curriculum at the University of New Mexico, as at other similar institutions, does not stress the practical side with much weight, the student does receive a certain amount of practical training together with theory.

Many employers, it seems, expect the young graduate engineer to step into the profession as though his college training had consisted of a four year course in the machine shop. But is this the real purpose behind an engineering training? Evidently the colleges and universities do not think so. However, when the student engineer's curriculum can be arranged in such a way as to get the proper balance between theoretical training and practical training, then he will receive the greatest benefit from his engineering education and should become better equipped to buck some of the tough engineering problems which will be encountered later on.

In the college of engineering at U. N. M., because of the increasing recognition of the necessity for additional practical training along with theory, attempts have been made to get the proper balance between the two.

In the mechanical engineering experimental laboratory conveniently located adjacent to the university power plant, the student engineer becomes thoroughly acquainted with refrigeration, equipment, steam turbine units, fuel research engines, air compressors, reciprocating steam engines and calorimeters of various types. Here not only the theory is studied but actual extensive tests are run on most of this equipment.

In the civil engineering laboratory are located a number of testing machines accessible, of course, to the other engineering departments as well. While in the classroom the student studies the underlying strength characteristics of materials, and learns methods of calculating stresses, maximum bending moments, torsional rigidity and other theoretical factors. After becoming acquainted with a good deal of the basic theories in connection with materials, tests are made for yield point, ultimate strength, torsion, hardness, ductility and other important characteristics. Val-

ues thus obtained are compared with theoretical values. Here are reinforced concrete beams and other masonry structures are designed by the student and tested to determine the strength, characteristics of failure, etc. The trend toward practicability is evident in such training.

In the drawing labs the theoretical designs are laid out and in some cases the product is actually constructed to test its feasibility, as well as to learn the practical aspects in design problems. M.E. students at U.N.M. have designed and constructed such devices as a steam engine and a refrigeration unit.

Each year a number of inspection tours are conducted by the various departments of the engineering college to further acquaint the student with current engineering activities.

The C.E. students have made a regular inspection tour of the Conchas dam project which is located in eastern New Mexico. This structure rises 235 feet above the river bed proper and the project has an overall length of about seven miles. The Conchas project has been a continual source of useful information to the observing student engineers, for here can be witnessed the actual processes of construction following in coordination with sound engineering practice.

On their regular inspection trip last year, the M.E. students journeyed to Pueblo, Colorado, the steel center of the west. Here they were conducted through the plant's to become acquainted with the numerous processes in steel production from the initial iron ore stage to the final sheet rolling stage.

These tours prove to be invaluable assets to the young engineer in his college training.

During the four year period necessary for an adequate engineering education, theoretical perhaps as the training may be, it is next to an impossibility for the student to escape completely from the practical side. A number of students in the college are employed in various capacities with downtown engineering concerns during hours outside the classroom, while a few are

located in the university's own power plant.

Almost all the upperclassmen engineers have been employed during the summer months with engineering firms, and in this way are enabled to gain a more practical background. As a matter of fact the average graduate engineer is not as "wet behind the ears" as the average seasoned professional claims.

The type of instructor probably has much to do with formulating the student engineers' practicability. To a casual outsider looking in, the "professor" is sometimes pictured as a "brain-truster" who struts about in a mortar board cap with his book of theories. Obviously this is a distorted viewpoint, as some of the leading professors are men with a practical background, men who have been through years of actual engineering experience. Almost the entire teaching staff in the college of engineering at U.N.M. consists of men who have had such experience, including a former chief highway engineer, a Diesel engine engineer, a maintenance engineer for air and steam equipment and others with similar ratings. Having this background together with a theoretical training as well, these instructors are quite capable of conveying to the student a sound engineering education.

In spite of all this talk about the "greenhorn" graduate engineer being insufficiently practical, I am inclined to believe the issue has been somewhat overemphasized and in a few instances opinionated.

In an article not so long ago one individual is quoted as saying that "when you ask a college graduate to remove a rusted nut he can't do it, but the man who came up from the ranks just takes a chisel and cracks it off."

True, the man who has come up through the ranks with considerable practical experience will be more adept, at the time, in his particular line than the inexperienced graduate who might attempt to tackle the same job. However, the fundamental objective in an engineering course consists chiefly of providing the student with the proper facilities for thinking clearly along technical lines and of providing him with access to knowledge when, where, or how he wants it. A thorough practical training can be acquired only through practice, and since one practices throughout a life time, even the "old timer" has something left to learn.

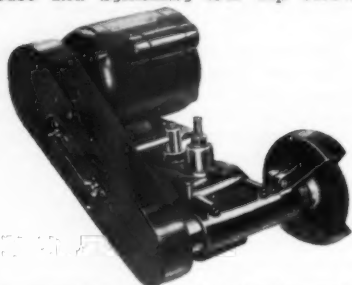
NEW Equipment

Mention of the Tool Engineer in your correspondence with manufacturers lends prestige to your request.

New Dumore No. 77 Grinder

Similar to the Dumore No. 7, using the same quills and grinder frame—the new No. 77 Dumore grinder has a ½ H.P. Capacitor start induction run or constant speed A.C. motor.

It employs "V" belt drives, belt tension being set by sliding the motor base and tightening four cap screws.



A complete set of interchangeable sheaves or pulleys allow speeds from 3,810 to 7,650 R.P.M. suitable for wheels of from 3 to 6 inches in diameter.

Being extremely rugged, the No. 77 is recommended where the majority of the work is external or heavy internal grinding. It is said to be highly efficient for production work.

Extra Heavy Duty "Hydratrol" Lathes

Hydratrol Lathes are now being built by Lehmann Machine Company of St. Louis in extra heavy duty type from 24" to 36" sizes; the 24" machine is illustrated below with standard Timkenized spindle.

These machines all have the Hydratrol features which are especially valuable for heavy machines as it requires no greater effort or time to make speed changes than on the smallest machines. There are sixteen spindle speeds, any of which are obtainable by turning one handle on the front of headstock which at the same time operates the slide rule, giving the spindle speed in revolutions per minute and the cutting speed in feet per minute for any diameter of work; also gives

a setting for numbered operations providing a predetermined correct speed for same.

Hydraulic driving clutches provide capacity 100% greater than the largest motors recommended and are self-compensating requiring no adjustment at any time, retaining always the same capacity.

Hydraulic primary and spindle brakes are also self-compensating and require no manual pressure to make them effective. When it is desired to free the spindle to turn it by hand, as in chucking work, the small handle at front of headstock is turned which immediately disengages the spindle from all connections so that it is perfectly free to turn by hand, the remaining mechanism being locked by the primary brake.

Reverse to the spindle is provided for all speeds and control of the forward, brake and reverse is provided by a handle on the apron and on the front of the headstock. Remarkable sensitivity of control to the spindle is exemplified in that when set for a speed of approximately 100 R.P.M. the spindle may be jogged to 20 or 30 positions in one revolution by the apron control handle.

Lubrication of all the mechanism is by pump which circulates or sprays filtered oil to all the parts and a remarkable feature is that if oil runs below the proper level to afford sufficient lubrication the machine, without injurious effects, will stop until oil supply is replenished.

Many refinements have been introduced in the design and construction of other parts of the lathe, particular attention having been given to the use of anti-friction bearings, proper enclosure of same and automatic lubrication, besides other features to provide ease of operation and safeguard to the mechanism. There are used in the standard machine shown, 88 roller and ball bearings selected as they may best

meet the requirements.

The carriage weight is partially sustained on ball bearing rollers but at all times maintains sliding contact with the bed, with the result that the effort required to move it by hand is reduced to less than one half. A pump furnishes oil from a reservoir between the carriage and the bed, the cross slide and the taper attachment. Roller bearing rollers are provided to keep carriage from misalignment on the bed as is the tendency under heavy feeds. This minimizes resultant cramping effects and greatly reduces strain on the feeding mechanism under severe demands.

The quick change mechanism is completely anti-friction equipped, bearings being sealed to retain oil and exclude dirt. Oil is furnished to bearings from a central reservoir which requires attention about four times a year. The end gear train to the quick change mechanism is also arranged with sealed roller bearings which require oiling about four to six times a year.

Throughout the lathe the steel parts are made of selected alloys heat-treated and hardened as best meet the requirements and gears are lapped on the Lehmann patented lapping machine.

The 24" machine shown in the base length weighs 17,400 lbs. arranged for motor drive but not including motor.

Motors are mounted on headstock or on hinged plate at rear of headstock as preferred and the standard drive is through multiple Vee-belts.

"Junior" Broaching Presses Announced by Colonial

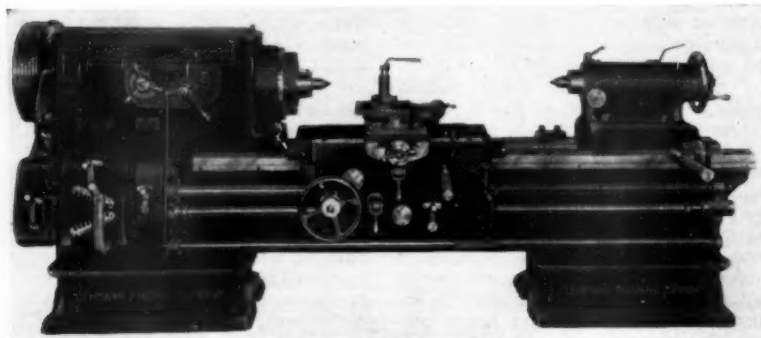
Broaching and assembly presses selling at well under \$500, complete with motor, hydraulic power unit and controls, have been announced by Colonial Broach Company, Detroit. The new presses, which have been placed in quantity production, are similar in virtually every detail—except for size—to the larger standard lines made by this company. They are designed to meet a demand for low-cost hydraulic presses for broaching of small parts and for miscellaneous light assembly work.

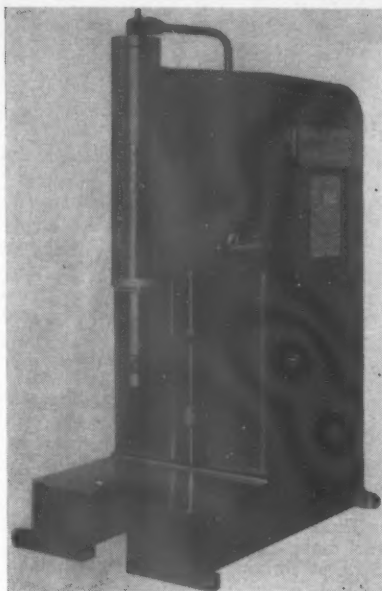
Measuring only 31 inches in overall height, the "Juniors" have a capacity rating of ½ ton, with stroke adjustable up to 10 inches. They are so designed that they may be mounted on standard benches, having a base area of only 12 by 22 inches.

The Juniors may also be mounted as accessories directly on such machine tools as lathes, etc., for pressing on and removing parts from arbors. Vertical mounting of the 1 hp. motor within the machine provides the Junior with a streamlined appearance and is of further advantage in locating the presses in limited space.

Design features include: built-in oil tank with sight gage and 1000 lb. pressure hydraulic pump, with sight gage for reservoir; completely enclosed 1200 rpm. direct drive motor; standard Colonial power-cylinder construction and single hand-lever operating con-

The New Extra Heavy Duty Hydratrol Lathe built by Lehmann Brothers Machine Company, St. Louis.



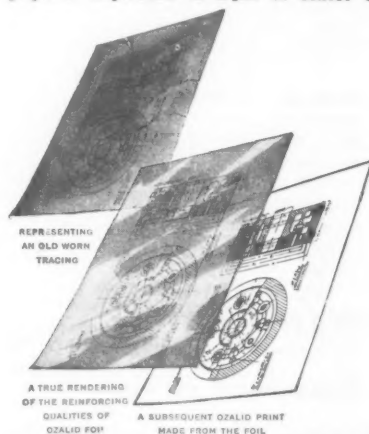


trol; stroke adjustable by means of sliding collars; 5 inch clearance between ram and machine frame; 8 by 12 inch platen; rugged frame for maximum work accuracy; etc.

Shipping weight is approximately 750 lbs.

New Ozalid Dry Development Paper

A new product which is attracting considerable interest in the technical reproduction field is a light-sensitive foil recently announced by the Ozalid Corporation, 354 Fourth Avenue, New York. This foil, which can be handled in daylight, is impregnated with light-sensitive chemicals just as are all Ozalid positive printing, dry-developing papers. Exposure to light of either an



arc or mercury vapor lamp and dry development by controlled ammonia vapor fumes in an Ozalid developing machine constitute the two simple steps necessary to produce a positive foil duplicate print.

The development of Ozalid foil represents a remarkable achievement when it is considered that results obtained with this foil were only accomplished heretofore by complex and expensive wet processes utilizing nega-

tives and requiring dark room handling. Of course, the fact that the Ozalid process is positive as well as dry magnifies the importance of this latest Ozalid achievement.

Illustrated is an application of clear foil, in strengthening and intensifying line detail in a print made from a foil duplicate of an old, soiled and worn tracing. The faint pencil lines of the original are intensified and the soiled and smuggy background deleted in the print made from this foil duplicate. The final result is a positive print which contains greater contrast and is much easier to read than the faded and soiled original. It is expected that a large amount of this foil will be used to rejuvenate valuable old tracings and thus make them available as permanent records for the image, once developed on the foil, is light-fast and wash-fast.

This foil is cellulose acetate or safety film and is non-inflammable and extremely durable. It has the same tensile strength in all directions and is practically immune from dehydration, the principal cause of brittleness and disintegration of paper.

This matted foil is ideally suited for use in reproducing a basic or fundamental design with additions and alterations without changing the original drawing in any way. These results are accomplished by first making a foil duplicate of the original and deleting from this foil copy that portion of the drawing to be dropped. This may be accomplished by use either of the block out method or Ozalid Correction Fluid. In either case that portion of the drawing which it is undesirable to retain can be bleached out and additions and corrections can be drawn in with either pen or pencil. Of course, subsequent Ozalid prints made from altered foil duplicate will reflect these changes.

In addition to these applications, the clear foil can serve as an intermediate copy from which any number of white-prints can be produced and thus will take the place of an original drawing in cases where duplicate originals are needed. A clear foil duplicate will also serve as a fast-printing substitute for a slow-printing original when speed is essential. Moreover, the extreme transparency of this foil makes it possible to stack as much as six foil prints together and so produce the detail of all six foil copies in one composite Ozalid white-print.

New Precision Length Standards Ultra-CheX

The George Scherr Company has just placed upon the market a new set of precision measuring standards under the trade name of ULTRA-CHEX. The set consists of nine standards accurate to 8 millionths of an inch and will make 71 combinations in steps of $\frac{1}{16}$ " up to $4\frac{1}{8}$ " and 41 combinations in steps of .100" up to 4.1".

Of outstanding interest is the fact that this set is available for less than twenty dollars, placing highest precision accuracy within the reach of the smallest shop. Also available with the ULTRA-

CHEX set is the Scherr Optical Parallel, accurate in planeness within 4 millionths. This is used to check parallelism of micrometer anvils by observing light interference bands on both anvils.

New Wheel Truing Tool Company Diamond Impregnated Grinding Wheel Dresser

The WTTCo diamond impregnated dresser is made by setting small, unbroken, natural diamonds of approximately the same size at equally spaced intervals throughout the matrix. These stones are so spaced that the cutting work is divided equally among many active points, thus assuring absolute uniformity of dressings. As one stone



wears away, another takes its place until the entire carat weight of stones is completely consumed.

The tool is then chemically processed so that every stone actually clings to the matrix... anchored there permanently by strong chemical bonds that will not break under great heat, pressure or abuse. This setting is done at very low temperature and pressure, yet the matrix is hard enough to resist abrasion, and just soft enough to wear away with the diamonds fast enough to maintain continuously free cutting. It is impossible to load or glaze the wheel with this dresser.

On the job, this dresser does clean, accurate work it is claimed. It is said to maintain the original qualities of the grinding wheel. An excessively hard dresser will often crush smooth the grains of the grinding wheel, and will make a medium grain wheel of soft grade act like a fine wheel of harder grade. The comparatively soft WTTCo matrix allows the diamonds to cut instead of crush, it is claimed.

The new dresser is used on rough, semi-finish and finish wheel dressing... on cylindrical, surface, internal, external, side wheel and cup-shaped wheels. The Wheel Truing Tool Company, Detroit, Michigan, offers them in a range of carat weights and several size stones to meet variations in wheel sizes, grains and grades.

Logan Equipped Processing Uncoiler

Through the courtesy of The McKay Machine Company of Youngstown, Ohio, Logansport Machine, Incorporated, Logansport, Indiana, manufacturers of air and hydraulic cylinders, valves, presses, etc., is able to illustrate a very unusual machine equipped with Logan Air Cylinders.

The machine is a Processing Uncoiler used primarily in steel plants in their cut-up line and pickle lines. Its purpose is to unwind strips from the coil without showing the ordinary tendency to cross break which is a characteristic of uncoiling hot rolled steel by ordinary methods.

The success of the machine depends (Continued on Page 47)

Milling Tools and CUTTERS

By
C. R. STAUB

Engineer, Michigan Tool Company

MUCH has been said about milling tools and cutters, and still a lot more remains to be said about types and designs in general, and their efficient performance. It is very encouraging, however, to note that most users have set up efficiency departments to check tool life, application of different designs for the various materials, speeds, feeds, etc.

A mistake that is quite often made is to order a milling cutter for some particular operation, then attempt to use it for both roughing and finishing in order to effect a saving. In reality the user is actually practicing false economy, because a cutter that is made for roughing is not suitable for finishing, and one that is made for finishing is not efficient when used as a rougher, because the cutting angles, chip clearance, and number of teeth are different in each case.

At times the production man is confronted with the job of milling castings with very thin wall sections. In cases of this kind it is very important that the cutter be at its best, and sharpened at the correct angles so that it can be used under its best possible working condition, both for roughing and for finishing, so as not to distort the casting.

There are in general use today, two types of milling cutters, the inserted blade type, and the solid type.

The inserted blade type is more generally used for heavy duty work, and high production jobs. It is also used on a general run of finishing and roughing cutters for light cutting, where an economy can be effected in replacing the blades with new ones, and retaining the original bodies. Another very good feature of the inserted blade type is that they can be readily adjusted and resharpened, and maintain a given size as well as chip clearance, until the blades are completely worn out. This is an advantage over the solid type. There is a point, however, where an economy is not effected by using the inserted type cutter, and that is in the case of small diameters where there is not enough body diameter for effectively holding the blades, and getting enough blades to effect an efficient cutting tool.

The solid types of milling cutters are very extensively used for form milling, as well as a general run of milling, and are by no means confined to light

milling operations. With the solid type, the same as the inserted blade type, the shear, rake, clearance angles, and number of teeth play an important part. Considerable thought should be given to cutting angles and shear angles in designing cutters. The material to be milled must at all times be taken into consideration as this governs the design.

The next in order of importance is the type of steel to be used in blades, bodies, and solid cutters. Milling cutters are subjected to the following physical strains: Abrasion, heat, and pressure. These may be relieved effectively by selecting the proper material for the cutter or blades. Pressure is caused by the material being cut, bearing down on the tool. Abrasion is caused by the material sliding over the face of the tool. Heat is caused by both of the foregoing physical actions.

It might be mentioned here that speeds and feeds play a very important part in producing heat and thereby affecting tool life, as well as finish. If too high a speed, and too slow a feed are used or vice versa, the cutting edges of the tool will fail, and cause the cutter to burn, because of the shock imposed on it by pressure and abrasion. Good judgment and a little

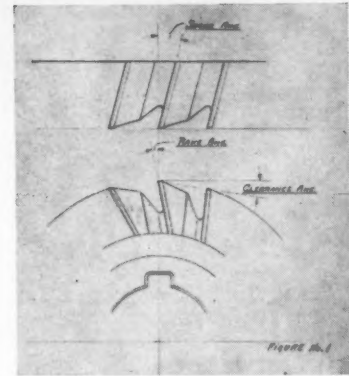


Figure No. 1.

time study here will save a considerable sum of money for the user in the course of a year.

There are several types of cutting tool materials that are in common use. Such as carbon steel, high speed steel, cobalt, super high speed, and tungsten carbide.

Carbon steel has plenty of toughness, but will not stand much heating. It is very well suited for cutting graphite such as insulators, and wood cutting tools because it will retain a keen cutting edge.

High speed steel remains the most popular material for metal cutting tools for the simple reason that it has application to most materials, and it will stand considerable heat and still retain its hardness. It has the best physical properties of all cutting tool materials—that is why it remains popular.

Super high speed steel contains more carbon, vanadium, tungsten and chromium than the ordinary high speed steel, thus giving it an additional power to resist wear. It is the most suitable for machining nickel, and manganese

(Continued on Page 34)

Approximate Speeds in Feet per Minute

	High Speed Steel	Super High Speed Steel	Cobalt	Tungsten Carbide
Alloy Steel	75	100	.....	.....
Mild Steel	100	125	.....	.....
Gray Cast Iron	100	120	150	250
Hard Cast Iron	75	100	125	200
Aluminum	1000	1000	1000	1500
Copper and Brass	250	300	400	500
Lead and Babbitt	1250	1300	1400	1500

Approximate Horsepower Required for Metal Cutting

Area of chip \times tensile strength of metal \times feed per minute in inches
 \div 33,000 = Horsepower.

Average Ultimate Strength of Common Metals; Pounds per Square Inch

Material	Tension	Compression	Shear	Module of Elasticity
Aluminum Castings	15,000	12,000	12,000	11,000,000
Brass, Cast	24,000	30,000	36,000	9,000,000
Bronze, Gun-metal	32,000	20,000	.....	10,000,000
Bronze, Manganese	60,000	120,000	.....	.....
Bronze, Phosphor	50,000	.....	.....	14,000,000
Copper, Cast	24,000	40,000	30,000	10,000,000
Iron, Cast	15,000	80,000	18,000	12,000,000
Lead, Cast	2,000	.....	.....	1,000,000
Steel Castings	70,000	70,000	60,000	30,000,000
Steel, Structural	60,000	60,000	50,000	29,000,000
Zinc, Cast	5,000	20,000	.....	13,000,000

Figure No. 1 shows clearance rake and shear angles.

PRODUCTION PERSPECTIVES

News of Mass Manufacturing From Everywhere

Business in metal working plants continues to show improvement, despite factories and plants closing for inventory and repairs. New buildings, additions and new equipment would seem to indicate that business with metal working industries is on the up grade.

Mid-West

Measured by dollar volume May sales of Johansson gages by Ford Motor Company was two and one-half times the monthly average according to information obtained at the home offices of the company. The month's volume was the best since April, 1930, it was said. Sales for the year to date are more than 25 per cent better than last year. Johansson gages form the basis for much of the precision manufacturing carried on in the United States. Because of this the increase in gage sales may forecast a quickened pace in manufacturing generally in this country, it was indicated.

W. A. Patterson, president of United Air Lines, on July 14 announced United intends to purchase six 42-passenger Douglas DC-4 airplanes. He formally notified the presidents of American Air Lines, Eastern Air Lines, Pan-American Airways and Transcontinental and Western Air, all of whom were parties with United to a contract with the Douglas Aircraft Co. for construction of an experimental plane of that type. The transports will be used on overnight coast-to-coast sleeper service, replacing present 14-passenger DC-3 type sleepers.

Wider use of conveying machinery in industry is resulting from stepups in production volume, according to C. L. Koehler, general manager of the Alvey Ferguson Company, Oakley, Cincinnati suburb. Congestion is kept at a minimum with a constant flow of manufactured articles to the shipping department, and improved working conditions result from lightening the burden on the employee, Koehler said. New developments are being made continually. One of the most recent is an electrically controlled system which permits an operator to keep lines of articles flowing smoothly toward the distributing point. A recent installation by the firm was in the plant of a shoe-box manufacturer, which turns out 380,000 boxes daily in an eight-story building. Because several lines converge into one main line, congestion occasionally takes place. It is eliminated quickly by the control board operator, who is warned of the "jam" by a red light which flashes on the control panel. This system also permits special jobs to be routed through the factory, he said.

A. J. Brandt, President of The National Tool Company, Cleveland, Ohio, announced July 17, the appointment of



John E. Snowberger, veteran Willlys-Overland employee, who has been promoted to the position of Works Manager by Joseph W. Fraser, President, after nineteen years service with the company.

Paul F. Zerkle, formerly Ohio District Manager of Midwest Tool Company and the McCrosky Tool Corporation, as Vice President in charge of sales. Mr. Zerkle is one of the charter mem-

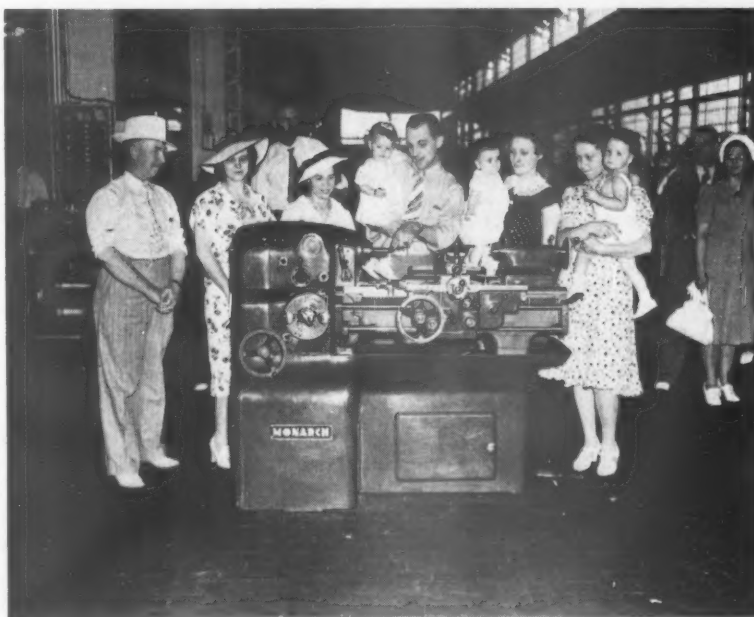
bers of the Cleveland Chapter of American Society of Tool Engineers and is widely known in the machine and cutting tool industry.

Firth-Sterling Steel Company announced July 6 the acquisition of an infant industry that looms large on the world armament horizon as well as in plans for our national defense. In a recent transaction, Firth-Sterling have acquired the American Carbide Alloys Corporation at Lewistown, Me., and Detroit, Mich., along with the exclusive rights for the manufacture of "Cutanit." Addition of "Cutanit" facilities, it is claimed, is of tremendous importance not only in domestic industry, but also in the shifting international situation.

A new factory and office building, the fifth expansion in five years, was completed the last week in June by the Monarch Machine Tool Company of Sidney, Ohio. The event was celebrated by a two-day open house attended by some 10,000 people. The feature of the open house was an exhibit demonstrating how machine tools make possible America's high standard of living. Local merchants and a score of the country's leading manufacturers supplied exhibits to the show which was keyed by "Without machine tools we would have the civilization of the Eskimo or the Chinese coolie, because hand labor produces so little. Deprived of machine tools, men are cheap and goods expensive."

(Continued on Page 49)

Almost the entire community from miles around, including women with babies in arms, attended the two-day open house at Sidney, Ohio, recently when the Monarch Machine Tool Company celebrated completion of its new office and factory building. Here are some of the open house visitors around a lathe in the final assembly department.



SUGGESTIONS FOR USING *Sintered Carbide Tipped Tools*

By

C. G. WILLIAMS

IN THE use of Carbide Tipped tools there are some important points that seem to have escaped the attention of the majority of experimentors and those who would increase the shop production through the use of these tools. For that reason I have formulated a series of notes that has seemed to be of the most importance to prospective users and also to the majority of present users that they may have more success and better success in their applications of this material in the shop.

Contrary to the popular thought, carbide tipped tools may be used on the majority of belt driven machines if proper changes are made to hold the work and the tool. Late tests have proven that it was not the tool so much as the application to the machine that was at fault.

Let us consider the lathe:—In the past it has been stated emphatically that carbides could not be employed successfully on any other than the very latest designs. However, experience over the years since the first piece of sintered carbide was received in 1927, has proven that all of these surmises and statements were given out because we did not know the real capacity of the machine and of the carbide placed on it.

In the absence of any other than a machine 30 years old on which to make experiments, much thought has been expended to find out why vibrations, that death dealing foe of carbides, were so prevalent on lathes as to almost forbid the use of carbide tools on them.

I have found that the two main foes to the use of carbide tipped tools on the old belt driven lathe has been the type of tool post that machine tool builders are so prone to use as part of every lathe equipment. This must be discarded entirely and a different type installed, either in a semi-permanent form as the open, one side tool rest with two or three set screws, or a form of turret tool rest.

The other detriment to the successful application of carbide tools to the lathe, has been the steel center in the tail stock spindle. All users of lathes have in the past, been accustomed to tightening up the center in the work, then redraw it slightly so that the lubricant may flow freely between the work and the center. This slight play is the greatest initiator of vibrations next to the tool post, and must also be eliminated. If the tail stock center is forced to tightly into the center of the work so as to eliminate all play, the center soon heats up and as machinists say "burns up".

The use of Ball bearing tail stock

centers on a lathe, no matter whether it be of yesteryear or of this year, will make possible the use of a carbide tipped tool and its absence promises failure.

To avoid unnecessary spring, which induces chatter, tools with heavy shanks are needed. At high speeds the stress on the tool is much greater than it is at the low speeds at which we have become accustomed to use H. S. Steel tools.

Some important suggestions follow:

Carbide tipped tools will stand a much higher heat and hold their cutting edge, than will High Speed Steel tools or Stellite tools.

If possible, cut dry to get highest efficiency. If for any reason whatsoever, it seems advisable to use a coolant, a very heavy flow should be maintained (about four or five times the volume as used for high speed steel tools). A light flow or intermittent flow, which may suddenly throw a quantity of coolant on the hot tip when a chip breaks short, will always cause the carbide to crack. The stream must be directed onto the chip at the point of the tool, and if possible a heavy stream directed from below the tool is helpful.

Grinding Room Recommendations

(1) The wear on the front of the tool should never exceed .010 inch. Then regrind the tool. For best results observe the following directions carefully:

(2) Always grind dry—not wet. Wet grindings will cause fine hair checks, in the edge of the tip, that will ultimately destroy it.

(3) Grind by hand, with light pressure, on a silicon carbide wheel (green). Heavy pressures will cut away the wheel without increasing the cutting action on the carbide tip.

(4) Keep the grinding edge of the wheel straight and open. Do not allow it to glaze, as this generates heat and lessens cutting action. The heat may cause cracks in the edge of the tip which will spread.

(5) Do not dip the tool into water as the quick change of temperature will cause the carbide to crack.

(6) Grind the front face first, then the side face (cutting side) and if needed touch up the top surface. Do not grind more from the top than is absolutely necessary as it is a waste of carbide. Use a 60 grit medium hard for roughing and a 120 grit medium hard for finishing. Lap or hone with a 220 grit hand hone to finish.

(7) All finish ground tools (whether ground on a silicon carbide wheel or

lapped on a diamond wheel) should be hand honed to remove unsupported carbide crystals or the ragged edge. This pre-setting of the edge prevents a destructive wedging effect of the loose carbide crystals into the binder between adjacent crystals of carbide which will start cracks in the cutting edge of the tip. Frequent honing of the tip during use will increase the efficiency and life of the carbide tip many fold.

(8) In cutting steels or other metals that give a long stringy chip, a chip breaker may be ground in the top of the tip. This chip breaker, however, should never be over $\frac{1}{8}$ inch deep at any time. As the tool wears at the cutting edge from cutting action or from grinding, do not grind the chip breaker deeper, but grind back, maintaining the original contour.

(9) On very hard materials, a negative top rake, either on the tip or in the chip breaker, will give added efficiency and life to the tool. Do not use a top back or side rake as it gives a thinner edge that will not stand up in use.

(10) Always set a carbide tipped tool so that the tool will be below center, but not more than 0.010 inch below center, of the work. When the tool is set on center or above center, it causes an undue amount of pressure on the front of the tool that increases wear and may cause a chip to spall off the top of the tip. When the cutting edge is placed below center, the wear is on the top of the tool, which, as it is not close to the edge of the tip, prolongs the life of the tool.

Working Recommendations

(1) A strongly built machine, run with as little vibrations as possible, with sufficient power for the high speeds needed, are BASIC conditions for the most efficient working of and with carbides. (This does not mean that carbides may not be used on belt driven machines at rates of efficiency about double that of HSS or Stellite, providing that a tool holder be put on the cross slide, and a ball or roller bearing center be placed in the tail stock spindle.

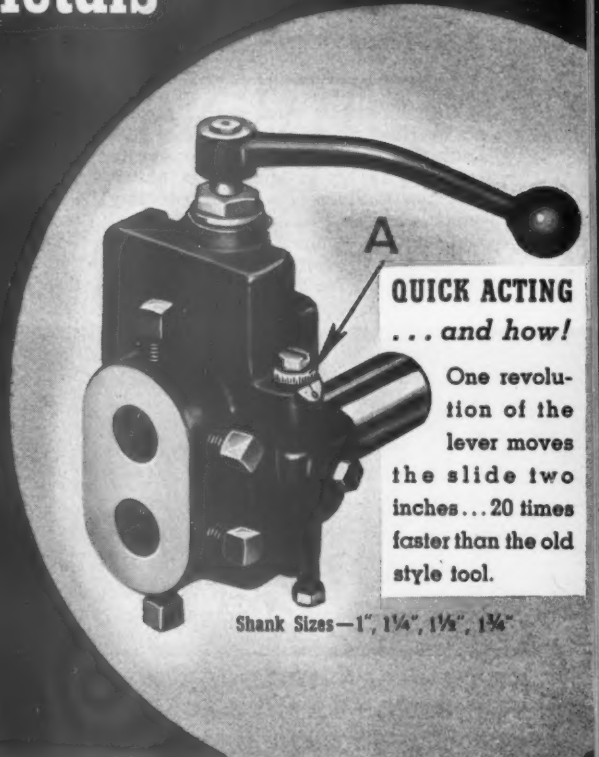
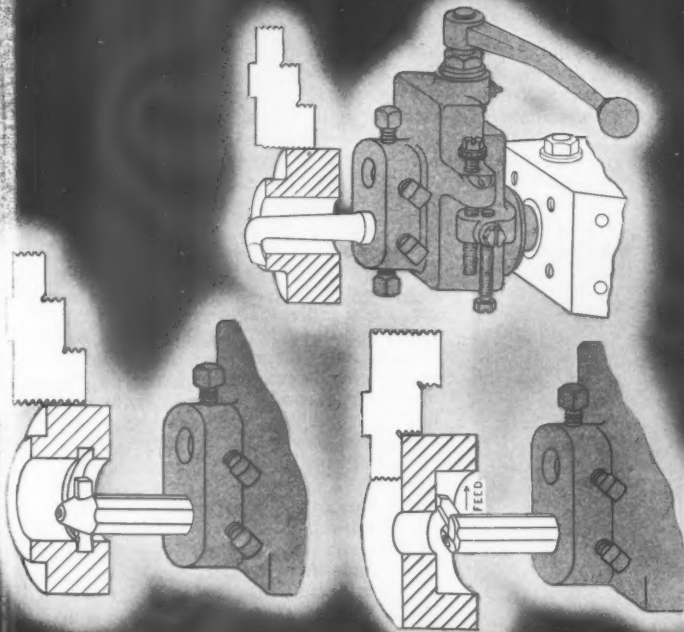
(2) Do not use a single screw tool post on any lathe, as it is conducive to the creation of vibrations.

(3) Do not use a steel or tipped live center on any lathe on which carbide tipped tools are to be used. They will burn up, wear badly and create vibrations.

(4) Give the tool as little overhang as possible. One half the tool depth should be sufficient.

(5) Have the machine tool running at
(Continued on Page 34)

If you do Recessing, Back Facing or Inside Facing on Hard or Soft Metals



...then you need this new Warner & Swasey QUICK ACTING SLIDE TOOL on your turret lathe

An entirely new tool that handles operations never before combined in one tool. It is designed especially for fast recessing, short facing cuts, accurate boring cuts, and inside facing cuts which must have a smooth surface. The slide is operated by the lever, with the action so smooth and powerful that wide forming cuts can be taken in steel or iron.

Many cuts formerly taken with cross slide cutters can now be done much faster with this tool held in the hex turret.

Graduated, adjustable stop screws (A) facilitate quick set-up and control slide travel so recesses and grooves can be cut to definite accurate depths.

Just let your operator get the "feel" of this tool either in soft brass or tough steel, and he will appreciate instantly that here at last is a *real* recessing and facing tool.

Let a Warner & Swasey field man show you how you can use this new quick acting slide tool—and other new and improved tools just developed by Warner & Swasey—to get better results from *any* turret lathes.

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Cleveland



This advertisement is one of a series introducing the new and improved Turret Lathe Tools designed by Warner & Swasey.

This new Tool Catalog and Manual, covering the most complete and modern line of turret

*Handy
Andy
Says* —



Was agreeably surprised to see an ad by Hotel Fort Shelby in "The Tool Engineer" pages. But then, there is no reason why hotels should not advertise their facilities to a growing society which, with conventions and annual meetings, should net a considerable business to the hostelry. The Shelby, of course, has been a sort of home to

Detroit Chapter for several years, has been the scene of serious meetings as gayer occasions. Personally, I like the place, feel at home there, the more so since meeting Mr. Frawley, genial manager, and the friendly Jerry Moore. It's a fine place to meet, whether for dinner or a joyful glass with the boys. Welcome to our columns, Fort Shelby!

▼ ▼ ▼

Met George Goodson, of the American Equipment Company, for the first time when we trekked down to Toledo a few years back. Toledo was then (according to Otto Winter) a suburb of Detroit, although I begin to think we could copy a few things from the neighboring town at that. Found George a

right genial guy, but from his capacity for steak would surmise that he is descended from the beef eaters of London Tower. Well, that's okay; he can laugh as heartily as he can eat (the two going together, somehow) and from what I have seen of him, those qualities are only exceeded by his capacity for work. He handles the Logan line among other things, has a habit of coming back with the info almost before a fellow can ask the question, and delivers the goods. In passing, might say that the supper party he threw for some of the boys a while back still lingers pleasantly in my memory, only, if I have to face another array of such viands I'm going to fast for a week beforehand. Good cheer, George!

▼ ▼ ▼

You know, these little puffs for our advertisers aren't exactly business with me, but a friendly gesture toward concerns and individuals who, through the years that the A.S.T.E. has been in existence, have contributed materially to the Society's growth and progress. To me, each is one of the gang, with distinct personalities, and many the man among them who has served the Society without a thought of other recompense than the satisfaction of seeing a fine organization become a force in the nation's industrial scheme. Well, their work has brought fruition; now, thanks to enthusiasm and good salesmanship of a worthwhile idea, the A.S.T.E. is a leader in the technical field. More, with Toronto chartered (that's right, isn't it?—I just heard the news) we're an international order and, with a new Chapter on the West Coast, we span the continent from ocean to ocean. Welcome, Canucks! —and Californy, here we come!

▼ ▼ ▼

A couple of the boys wrote me, offering congratulations on the last column, but in the hubbub of moving my July copy got mislaid, so I really don't know what it's all about, not recalling what I wrote. But thanks for the "fan mail," which is always welcome to a struggling young man my age. Anyway, it was something about coming across and landing in America, so I'll resume from there. You see, this hot weather gets a fellow down; and while the rest of you lucky birds are vacationing or hieing off to California I'm getting my recreation trying to make a fallow back yard look like what it should—next year. So bear with my reminiscences; I'll start thinking again by the time we go into action next fall. (By the way, I'll show you my snooty pups when we meet in Cleveland.)

▼ ▼ ▼

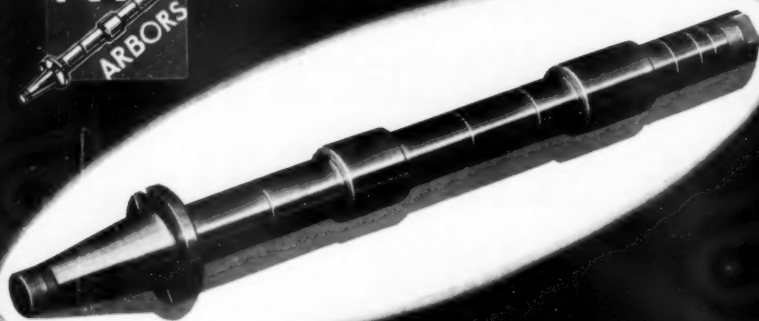
One of my ambitions, as a tad on the other side, was to own a pair of wooden shoes like the ones the peasants wore, but it wasn't until the time of leaving that my desire was realized. Some time after my advent in the promised land, I decided to show off my clogs, put them on and, of all places,

(Continued on Page 26)

QUALITY

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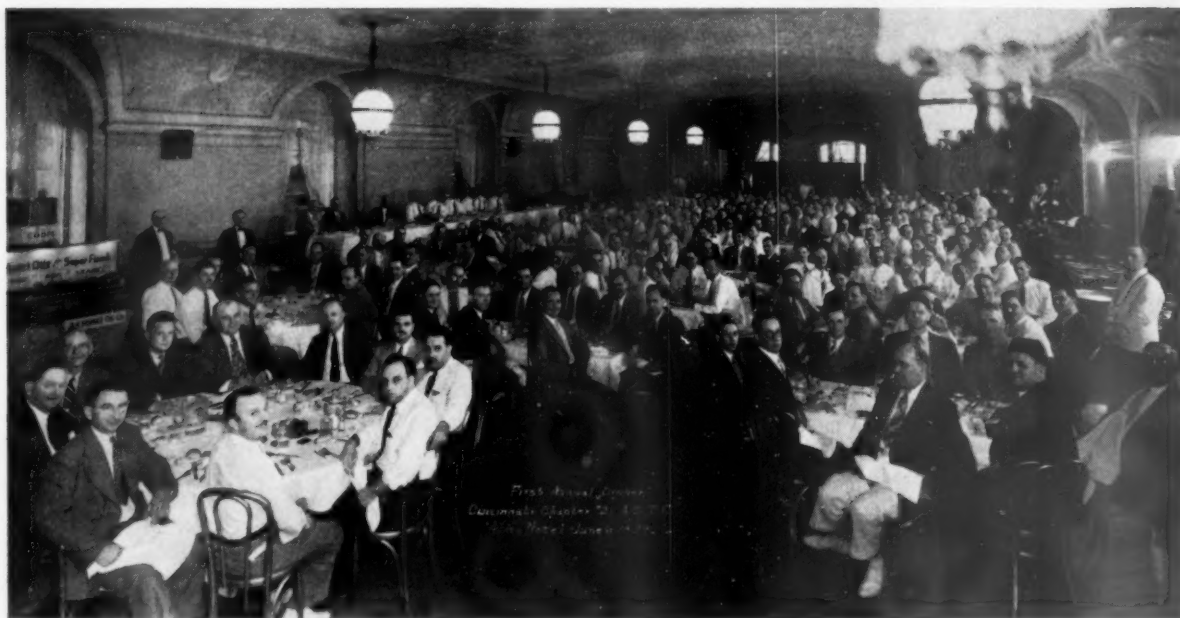
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Chapter Doings

By GEO. J. (JITTER) KELLER



Cincinnati Chapter celebrated its first anniversary, June 5th at the Alms Hotel. This "First Annual Dinner," was well attended.

Well, news came in pretty good this month considering that all meetings have been suspended until September. In the meantime, the boys are having outings, clambakes and what-not. Personally, I'm rather glad because I, too, am looking forward to a vacation. Right now I can see that little cottage down by the lake, the boat, the fishing tackle—now if I could only see the fish, I'd really have something.

July 15th will long be remembered by 159 of the **Detroit** A.S.T.E.ers who participated in the annual golf tournament held at Gowanie Golf Course near Mt. Clemens. Old Man weather was on his best behavior; a cool breeze and a bright sky making it a delight to chase that contrary little pill. Frank Gertiser, head of the Detroit branch of

Charlie Theide, Detroit Chapter Chairman, displays trophy.



Toronto—First International Chapter Organized

Toronto, Canada Tool Engineers were granted a charter June 28th to operate the first International Chapter of the A.S.T.E. Pres. Jas. R. Weaver and Ford R. Lamb, Ex-Sec., presented the charter to some 28 members. The chapter will embrace surrounding Canadian Cities, such as Hamilton, St. Catharines, Galt and Oshawa. Arnold Thompson of Canadian Acme Screw and Gear, is chairman; Ed. Barker of Modern Tool Works, Vice Chairman; Cecil Dyson of Union Twist Drill Co., Secretary; and Earnest Wearm of Acme Screw and Gear, Treasurer.

the Cincinnati Milling Machine Co., accomplished most with the fewest, shooting a winning score of 78 to claim the trophy. The runner up, Perry Gasnier came through with an 85. When the puppies complained and the inner man felt weak, the lads would lay down the sticks and hie themselves away to the club house to partake of a buffet luncheon and other refreshments all included in the original tax. By the way, Detroit had a very interesting session in June. Dinner at Dearborn Inn was attended by 329 and about 500 were present for the technical sessions in the Ford Rotunda as well as a plant trip through the Ford Plastics Division. Transportation to and from the Rotunda, the Inn and the Plant were furnished by their host, The Ford Motor Company. The speakers were Dr. J. S. Laird and Mr. Joe Steward.

Rockford Chapter held their second annual golf tournament at the Morgan

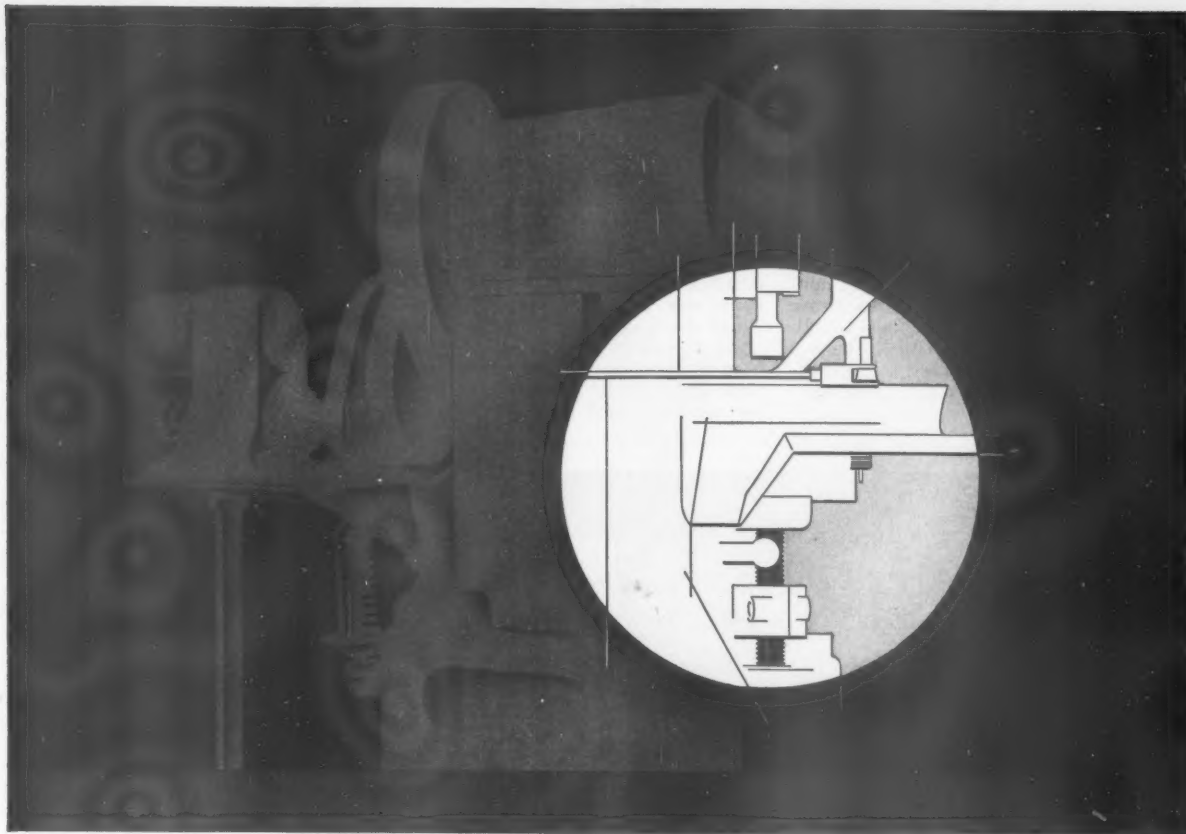
golf links, two miles west of Beloit, on the afternoon of June 17th. At the nineteenth hole an ample supply of refreshments was available. At 7:30, in the Morgan Lodge, thirty-eight members sat down to a splendid dinner. After the dinner, prizes were awarded.

Rockford was the guest of the **Tri-City** Chapter at their meeting held June 14th at the Rock Island Arsenal. There was an inspection trip, then dinner attended by 250. Among those present were E. W. Dickett of Rockford, Ford Lamb of Detroit, and Brig. General C. T. Harris of Washington D.C., Assistant Chief of Army Ordnance. Following the dinner, Colonel Norman Ramsey, Rock Island Arsenal Commandant, spoke on

(Continued on Page 34)

Frank Gertiser (right), winner Detroit Chapter Annual Golf Tournament, Perry Gasnier (left) runner-up.





TO REDESIGN OR NOT? THAT WAS THE QUESTION

Finding just the right material for a single trouble-making part sometimes saves redesigning an entire machine; and that means a saving all around.

For example: breakage of the lower die carrier of a 15-ton medicinal pellet press made it look for a while as though some drastic changes in design would be required — with consequent increased manufacturing costs, to say nothing of loss of interchangeability.

Then the manufacturer adopted Chrome-Molybdenum (SAE 4140) Steel, which combines high tensile

and shock-fatigue strength. That was two years ago. There has not been a single failure since. Redesigning has been obviated, interchangeability preserved, customers pleased.

Similarly, Molybdenum Steel may prove the answer to your special service problems. Our technical book, "Molybdenum in Steel", giving practical data, will be sent free on request to production executives and engineers interested in taking advantage of modern steels.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM MOLYBDATE

Climax Mo-lyb-denum Company
500 Fifth Avenue, New York City

HANDY ANDY SAYS

(Continued from Page 22)

started for the docks, redolent with the muck of an ebb tide along with other waterfront odors. A gang of street gamins followed, and a right merry parade it was until they ganged me. One against many, I used my wooden footwear for clubs, was finally pushed off the dock and into the ooze, from whence a longshoreman pulled me, reeking and bedraggled. The last I saw of my wooden shoes they were bobbing merrily toward the blue Atlantic, perhaps on their way back to Sweden. (They weren't really comfortable anyway.)

I was about nine when the Spanish-American war broke out (which would make me about fifty, eh? Yeh, that's right) whereupon every other son born was named George Dewey. My J's still soft, and the corners but slightly rounded off, I was a "foreigner" and, tow head and apple cheeks to the contrary, must perform be a Spaniard. The "Americans" had built a fort on a vacant lot, from whence they peppered me with B.B. shot, arrows and other missiles whenever I passed. When there was no longer sitting space between the welts I hid to the neighborhood blacksmith, made me a sword from a piece of tire iron, then, with a wash boiler lid for a shield, charged the works. A few minutes belaboring

with the flat of the weapon soon reduced the enemy, wherefore I became Teddy Roosevelt and ruled the roost. Oh kindly Time, turn backward!

Little by little I learned, language and the ways of the land, my school often enough, one of bitter experience. A boy put up his hands and, thinking it was a game, I did likewise. He punched my nose! Another had me knock a chip off his shoulder; he too, punched my nose. I dug for "buried gold"; fell for a relay race when one was supposed to grab a stick from another's hand—Gosh! But, time came when the worm turned and life became easier. Once, we moved to an Irish section, the only Swedes in the district, and oh, what a time that was. Those Irish spalpeens tied tin cans to my dog's tail, wrapped the cat in flypaper; once gosssoon made the mistake of throwing his pet cockerel (a big Brahma) into the yard where my bantam rooster ruled a diminutive harem. The saddened owner said they were going to cook the cockerel anyway. Come St. Patrick's day, they painted my white rats green! I had to kill 'em to put them out of their misery. The rats, of course,

Oh, it was a varied life, those first few years, with much of joy, some of misery and boyhood tragedies. But, we grew up together, fought together and cemented friendships, me and those boys from "Corktown," Little Italy and Swede Hill, in adult years would laugh at boyhood recollections. That is one thing that puzzles me, in view of childhood memories of a place "where life was so blissful, so sweet, so serene; and dawn but preluded the skylark's paean," that with so much of intrinsic worth among all racial stocks, there should be hatreds and misunderstanding. To what end? Personally of a stock that has never known persecution—certainly hasn't submitted to it!—nor engaged in it, I have no patience with racial or religious discrimination beyond an insistence that no one regiment me to his school of thought. Believe what you want, practice what you will as long as it's not anti-social, but leave me my own convictions and freedom of thought, and all is well.

That is one of the reasons that America has become an arena of dissension and propagation of exotic isms, that minorities, jealous of their own rights, have encroached on the rights of others. Another is that, instead of "selling America," i.e., propagating the American System of freedom and initiative, we have devoted too much time and energy denouncing extraneous codes of conduct and political credos, thereby advertising them out of all proportion to their worth. Sure, these alien mongers of dissension are a nuisance, and I'm for sending 'em all back across the big drink, but then, we have plenty of native screwballs as well who need to be kicked in the pants. Gentlemen,

(Continued on Page 42)



NEW SOUTH BEND 1" COLLET LATHE

9" SWING OVER BED
1 1/2" SPINDLE HOLE
12 SPINDLE SPEEDS
POWER CROSS FEED
POWER LONG. FEED
SCREW THREADS
4 TO 224 PER INCH

1" Collet Capacity 9-inch Swing South Bend Underneath Belt Motor Drive Quick Change Gear Tool Room Precision Lathe. Mounted on all steel welded bench. 1/2 H.P. instant reversing ball bearing motor and 12-speed drive are enclosed in left side of bench.

THIS new 1" collet capacity 9-inch swing back-geared, screw-cutting lathe has the time saving features of an engine lathe combined with the sensitivity and accuracy of a fine precision collet lathe. It is capable of the most exacting tool and instrument work, and has the power and rigidity for taking heavy cuts on high speed production operations.

Tool Room Attachments as illustrated include hand wheel draw-in collet chuck attachment, telescopic taper attachment, micrometer carriage stop, thread dial indicator, and collet rack.

Manufacturing Attachments available include hand lever draw-in collet chuck attachment, semi-automatic hand lever bed turret, double tool rest, automatic carriage stop, four-way tool post turret, oil pump, piping.

Immediate Delivery can be made on all popular sizes of South Bend Lathes from dealer display stocks in principal cities; a few are listed below.

ON DISPLAY IN PRINCIPAL CITIES
Boston, Mass.—The MacKenzie Machinery Company
Buffalo, N. Y.—J. L. Osgood Machinery & Tool Co.
Chicago, Illinois—C. E. Burns Machinery Company
Cleveland, Ohio—Reynolds Machinery Company
Detroit, Michigan—Lee Machinery Company, Inc.
Los Angeles, Calif.—Eckles & Davis Machinery Co.
Milwaukee, Wis.—W. A. Voell Machinery Company
Newark, N. J.—L. E. Edwards Machinery Company
New York, N. Y.—A. C. Colby Machinery Company
Philadelphia, Pa.—W. B. Repp Machinery
Providence, R. I.—Geo. T. Reynolds & Son, Inc.
San Francisco, Calif.—More Machinery Company
Seattle, Washington—Star Machinery Company

Send For
Illustrated
Catalog



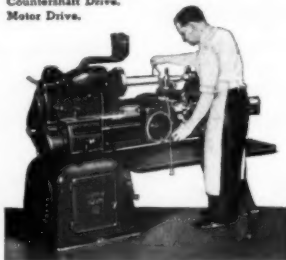
SOUTH BEND LATHE WORKS

Lathe Builders Since 1906

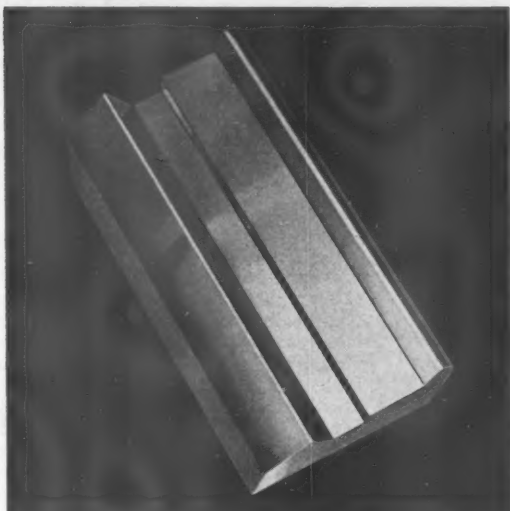
923 E. Madison St., South Bend, Indiana, U. S. A.

68 Sizes and Types of Lathes

9", 11", 13", 14 1/2", and 16" Swing.
3' to 12' Bed Lengths.
Countershaft Drive.
Motor Drive.



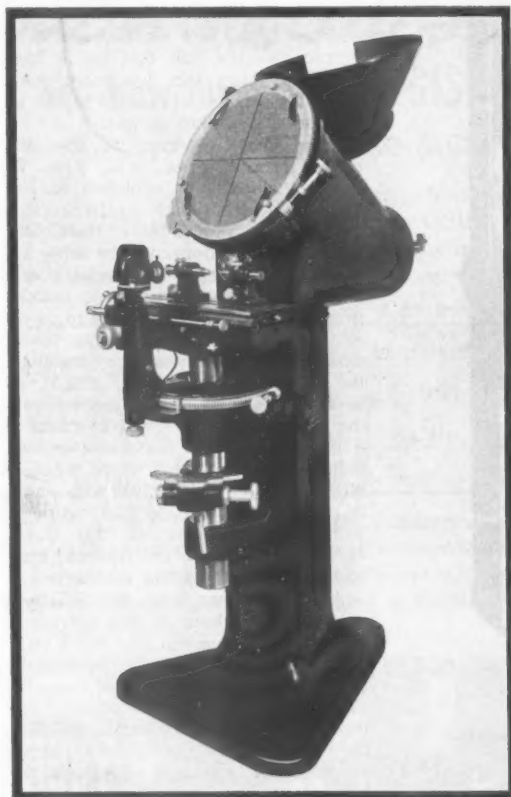
16" x 6' Underneath Belt Motor Drive Lathe



THIS FORM TOOL IS EASILY INSPECTED
ON THE J&L PEDESTAL COMPARATOR



This is a typical job on which Optical Inspection can help you



Jobs like this are ideal for optical inspection . . . and when rapid, low cost, simplified inspection is demanded, J&L optical inspection can save you time and money. What's more, it enables you to take full advantage of specified tolerances. Yet each new use of this technique involves special problems. For twenty years, Jones & Lamson engineers have been solving such problems. In the course of this work, they have built up an unequalled background of information which Jones & Lamson would like to place at your disposal to help cut your inspection costs.

Whether or not you plan to purchase optical inspection equipment, you are free to consult J&L. The nearest engineer in your territory will report to you at the earliest possible moment.

Send for him. On the basis of past performance over many years, the chances are that he can supply the answer. In any case, it will not obligate you to put your visual inspection problem up to J&L.

**THREAD TOOL DIVISION OF
JONES & LAMSON MACHINE COMPANY
SPRINGFIELD, VERMONT, U. S. A.**

Who Is The Employer?

By

J. L. ADAMS

PLANT ENGINEER
MIDLAND STEEL PRODUCTS COMPANY

A FOUR cornered discussion, between the writer and a trio of acquaintances, brought out points that should be of interest to all who have to do with men and machines. One of the group, who has taken the share-the-wealth plan too literally, deplored the disparity between the "big shots," so

called, and the workers in the lower brackets. "The employers get all the breaks," he stated. "Power, money, ease and luxury, while the workers who produce the goods get the dirty end of the stick." Eliding the literal text of the discussion that followed, the writer brought up the question: "Who is the employer?"

Except in the case of small shop owners and merchants employing a few workers, the corporation is not an individual, cannot be so regarded. There are stockholders—professional people and manual workers, widows and or-

phans—who have invested greater or lesser amounts as a means of making idle money income producing. Some of these shareholders are wealthy, some in moderate circumstances, the majority comparatively poor but a bit thrifter than the average. From these are elected directors and officers, each of whom is an employee of the corporation, each with more or less specifically outlined duties and responsibilities.

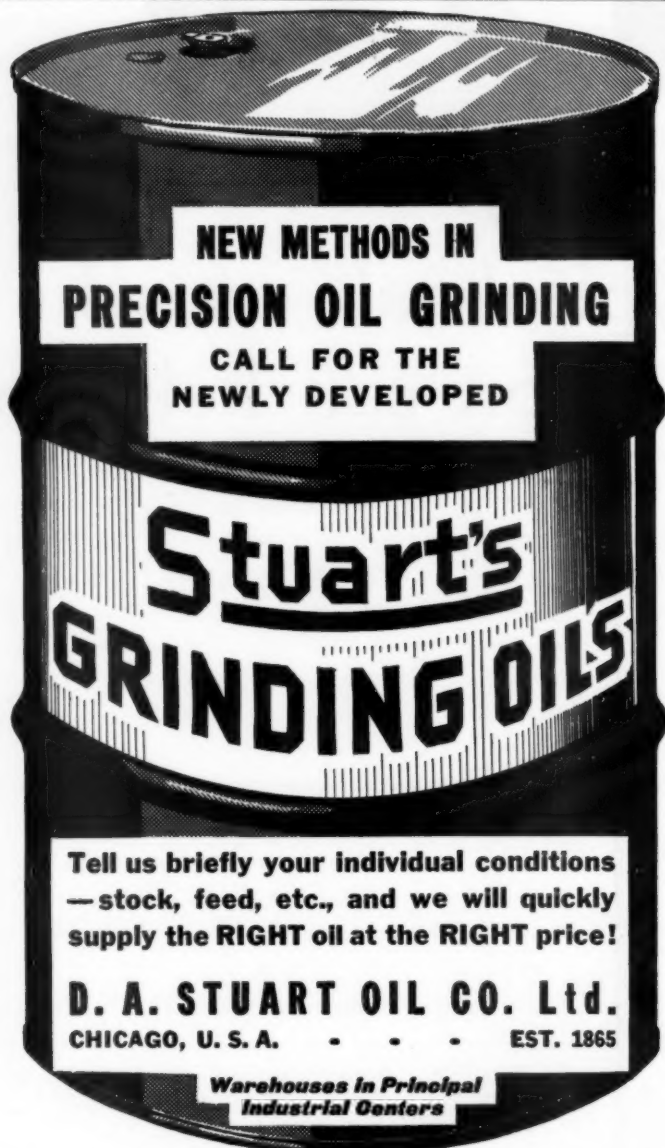
My immediate superior, for instance, is just as much an employee of the company as I am, to put it in a personal light, and while he can doubtless fire me if so minded, he can in turn be fired by his superiors, and so on up the line until board action may be needed for removal of a high official. Sure there is disparity; the higher you go the bigger the salaries, but then, the greater the weight of responsibility. The sales manager, for example, must maintain a station far beyond the scale of even a highly trained works manager, higher even than the president of the company in many cases. That takes money.

Inversely, it nets money. He has to have "entree," which means social background and fraternal connections, he must entertain on a lavish scale, must be on the job 24 hours a day. For him, a crick in the neck or a Charley Horse must be endured with a smile at the golf course (where many a deal is made) and he must dance at the social gathering even if the bunions scream for release from a tight shoe. But, he comes home with the bacon (orders) and keeps the working force of the plant employed. However, he is not the "boss" in a literal sense, but an employee. It's just that he is highly qualified for a job that takes a considerable amount of money to run and, incidentally, to live up to.

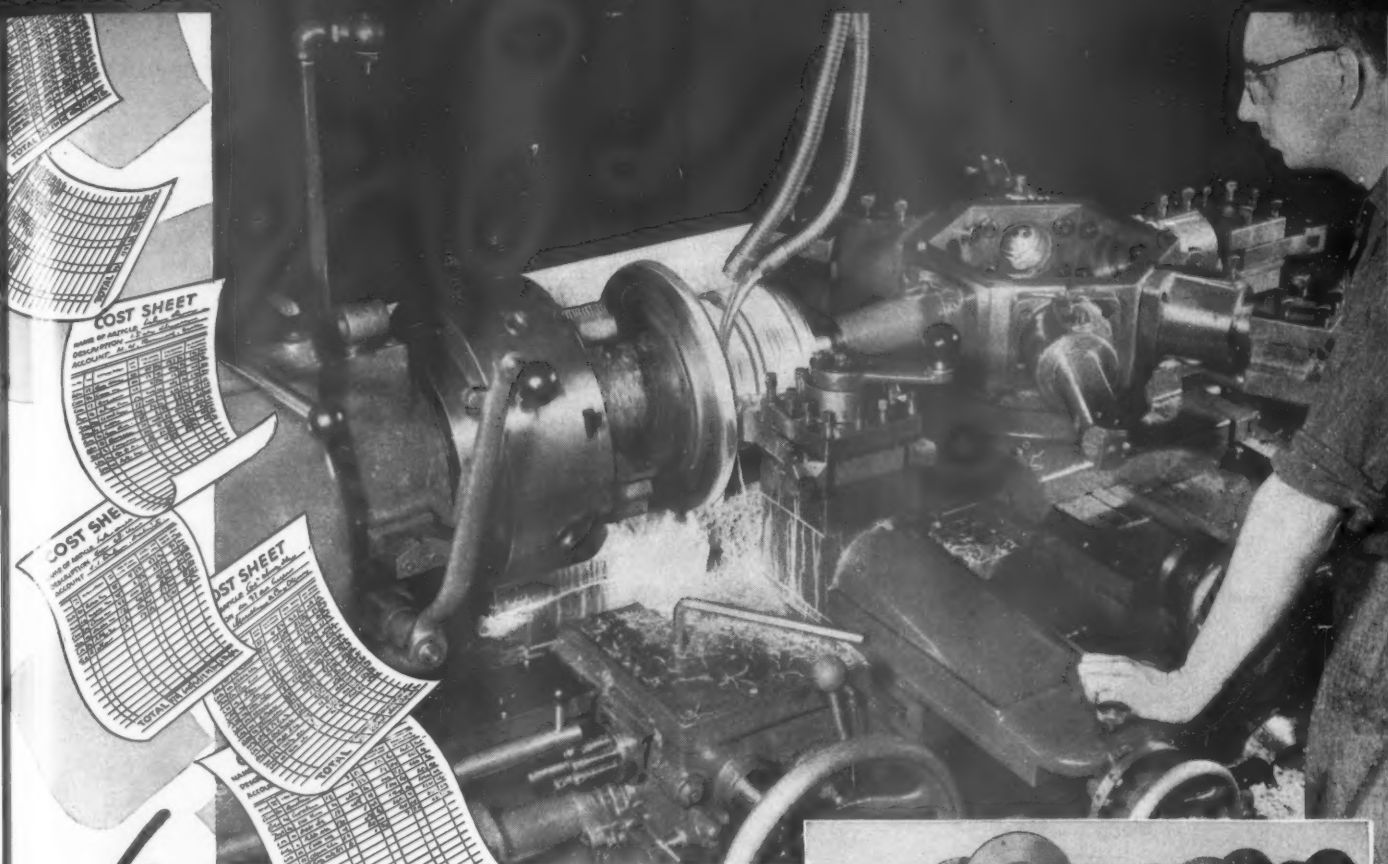
From the Chairman of the Board down through prex., v.p., g.m., wks. mgr., etc., each man is chosen for background of experience and training, together with outstanding qualifications of leadership. There may be other men, even in the lower strata, equally qualified, but there can't be more than one president nor, in most cases, more than a bare minority of executive officers. Conceded that they get the cream and the gravy they probably earn it. That is one phase of the industrial set-up that workers in the lower brackets seldom consider, that managers and executives, like caskarets, work while the others sleep. Anyway, all who engage in creative or productive work are workers, regardless of the bracket they're in; besides, the demand on income increases as the scale rises.

Another thing that the share-the-wealthers overlook is that workers in most corporations can buy stock on the open market (if it's available and they have the money) in which case they become owners in the company with the same rights as the rest of the shareholders. (Those "rights" may include assessments or passed dividends, with

(Continued on Page 44)



Watch for "STUART OILS" in operation at Cleveland Machine Tool Show!



Watch the Cost Sheets!

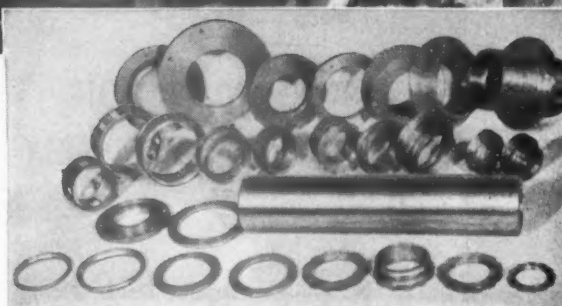
... see how much money GISHOLTS Save on these small lot jobs—

● When this manufacturer reviewed his cost sheets on the parts machined on his new Gisholt 2L High Production Turret Lathe, he found that machining costs on miscellaneous parts had been reduced more than 50%. Here are a few typical examples:

MACHINING PARTS IN LOTS OF 8 PIECES

	Time on old machine	Time on new Gisholt	Total Time Saved	Money Saved
Part No. 1—Side Bearing & Cover.....	53 Hrs.	26 Hrs.	27 Hrs.	\$46.48
Part No. 2—Pitman end thrust collar...	36½ Hrs.	20½ Hrs.	16 Hrs.	27.52
Part No. 3—Inner race bearing collar..	33 Hrs.	14 Hrs.	19 Hrs.	32.72

These savings were made despite the adherence to extremely close tolerances. But such savings are not at all unusual for these new Gisholts with the sturdy cross-feeding hexagon turret which permits multiple cutting and greatly reduces cutting time. A Gisholt engineer can help you make such savings.



★ In making many parts like these, boring cuts are taken from the hexagon turret while other operations such as turning, facing and grooving are taken from the square turret. Facing operations may also be taken from the hexagon turret by merely feeding the turret across the work. Gisholt standard tools, tool holders and boring bars were used on this work.

Visit the
GISHOLT EXHIBIT
at the
Machine Tool Show



"YOUR SMARTEST INVESTMENT TODAY—BETTER MACHINE TOOLS"



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MACHINE COMPANY

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TURRET LATHES • AUTOMATIC LATHES • TOOL GRINDERS • BALANCING MACHINES

New Literature

of Interest to the Tool Engineer

Make your request for literature or information on New Equipment direct to manufacturers named, mentioning *The Tool Engineer*.

● That the present wave of anti-machine propaganda, which claims that unemployment is increased by technological developments involving the increased use of machinery, is based on fallacious assumptions is asserted by Messrs. A. W. Rucker and N. W. Pickering in a study just published.

The authors detail the several falla-

cies underlying the claim of the anti-mechanization proponents and state that displacement of labor at the point of machine use is more than counter-balanced by the addition of labor at the points of machine construction, transportation, installation, maintenance and replacement.

● A new, eight page bulletin has recently been issued by the Sunnen Products Company, 8002 Manchester Avenue, St. Louis, on their latest Model "Ma" Four Speed Precision Honing Machine.

Tool engineers, production managers and others faced with the problem of finishing internal cylindrical surfaces

of small diameter will find this bulletin interesting and helpful.

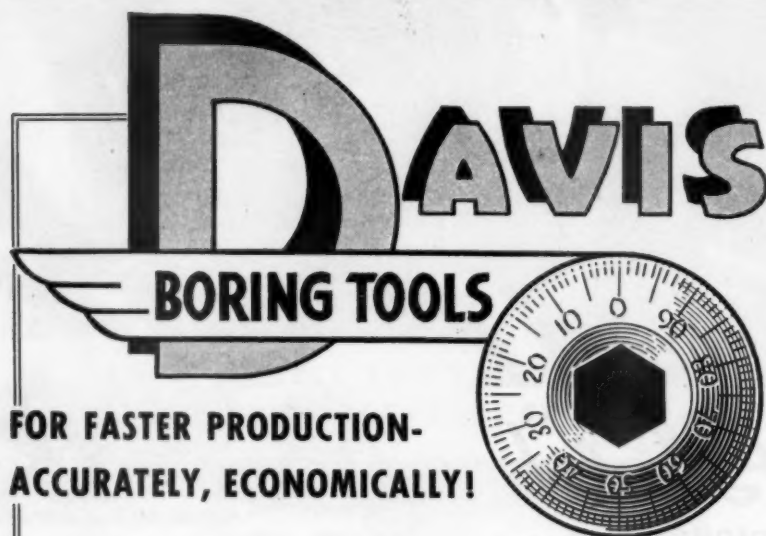
It describes in detail the Sunnen method of correcting out-of-roundness, taper, "wavy" and rainbow errors caused by previous operations. It shows how small diameters can be accurately honed to close tolerances with supersmooth surfaces.

Several pages are devoted to typical examples of the wide range of applications for which the Sunnen Precision Honing Machine is especially adapted.

The important subject of surface finishes is covered in detail with interesting photomicrographs and profilographs of various stages of finish.

This bulletin—PHG 676—will be sent free upon request, mention "The Tool Engineer" when writing.

● We take pleasure in sending you under separate cover, marked for your personal attention, a specimen of our new Socket Screw Drafting Room Chart that we have just prepared for distribution.



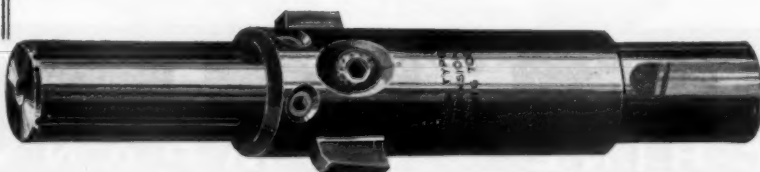
The famous Davis Micrometer Type Boring Bar, pictured below, will introduce new standards of efficiency and economy into your plant.

Operation at maximum efficiency is assured by quick, accurate Micrometer adjustment of cutters for size.

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DAVIS BORING TOOL DIVISION
Larkin Packer Co., Inc., St. Louis, U.S.A.



This Chart condenses in a form suitable for ready reference, a large amount of data essential to users of Socket Screws. We will be very happy to send one of these Charts to any engineer, draftsman or production official on request without charge.

● As the result of an engineering survey of several years' duration, Carboloy Company, Inc., Detroit, have issued an engineering bulletin giving detailed recommendations for proper Carboloy grade selection, suggested speeds and feeds, and a method for determining power requirements.

The bulletin groups the materials to be machined into three main classifications, i.e., steel, ferrous castings, and non-ferrous and non-metallic materials. A full-page chart of recommendations is devoted to each of these classifications with specific recommendations given for a wide range of metals within each classification. For example, in the chart on steel, S.A.E. steels are listed in 10 classifications with specific recommendations for each. Recommendations cover the suggested grade of Carboloy to use, minimum and maximum speeds, a suggested safe starting speed, and a

(Continued on Page 32)

HERE IS A SPECIFIC ANSWER TO YOUR QUESTIONS:

What speeds shall we use with CARBOLOY?

What CARBOLOY grade shall we put on the job?

What horsepower is required with CARBOLOY tools?

Engineering Bulletin GT-114 has been published as the result of a three-year survey of Carboloy tool applications on all types of machines and all commonly machined metals and non-metallics.

It contains specific recommendations for proper speeds at which to start Carboloy tools, suggested minimum and maximum speeds on each application, proper Carboloy grades to use—and a method for determining the horsepower required.



Steel Cutting Recommendations:

Included in this bulletin are specific recommendations for steel cutting, based upon our study of this problem since the time Carboloy tools were first introduced. We feel that they represent a valuable contribution to the successful use of cemented carbides on steel.

Copies of Bulletin GT-114 gladly sent upon request.

CARBOLOY COMPANY, Inc.

DETROIT, MICHIGAN

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CARBOLOY
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BULLETIN
GT-114

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Send us your free Engineering
Bulletin No. GT-114 giving specific
data on the use of Carboloy Tools.

Name _____ Title _____

Company _____

Co. Address _____

City _____ State _____

NEW LITERATURE

(Continued from Page 30)

power constant to be used in determining horse power requirements in each case. To use the chart, you select the proper column which specifies the feed and depth of cut called for on your application, and the column listing the metal you are cutting. The point at which these columns converge contains the desired information.

This bulletin contains certain features that should be of particular interest to the practical shopman. It avoids the common method of listing recommen-

dations so broad that errors in selection are probable. For example, in the matter of Carboloy grade selection, a definite grade is specified in each case that has a wide margin of safety—one that can be used with good results under average conditions. The bulletin also is specific in regard to proper speeds to use. In each case a definite, safe starting speed is listed and accompanying this specific recommendation is the suggested minimum and maximum speeds to which adjustments can be made after starting the job.

Copies of this bulletin (Bulletin GT-114) may be obtained from Carboloy

Company, Inc., 11145 E. 8 Mile Road, Detroit, Michigan.

A companion bulletin (GT-115) listing the physical characteristics and general use of all Carboloy grades is also available.

● The Landis Tool Company has just made an exceedingly useful Speed Calculator available to those responsible for the operation of precision grinding equipment. One side of the calculator makes it a simple matter to quickly compute the revolutions of the grinding wheel per minute for six different surface speeds. Wheel diameters ranging from 1" to 42" are included.

The reverse side of the calculator makes it just as simple to compute the revolutions of the work per minute for four different surface speeds. Work diameters ranging from ½" to 10" are included. In addition brief yet pertinent information having to do with the theory of wheel and work speeds will be found on the calculator.

Anyone interested may secure one of these by requesting it on the letterhead of the organization with which he is connected.

● Whitman and Barnes have issued a new catalog no. 96 features of which are as follows: A strikingly illustrated cover which is varnished to prevent dust and dirt from adhering. Complete illustrations and listings of all types of drills, reamers, screw extractors, counterbores, interchangeable punches, etc., manufactured by Whitman & Barnes.

Listings of affiliated types of tools have been grouped so that there are no unnecessary pages to leaf through, enabling buyers and users alike to find the required information quickly.

● The Gisholt Machine Company offers free catalogs for the selection of standard tools that embody new principles of modern turret lathe practice, designed to take full advantage of today's better cutting tools. The pages of these catalogs fully illustrate an extensive line of tools, holding devices, boring bars and reamers, and show how they are adapted to a wide range of work on Ram Type Universal Turret Lathes, High Production Turret Lathes and Heavy Duty Turret Lathes.

Among the regular standard tools will be found multiple cutting tools with rigidity for heavy feeds and fast speeds that will turn two, three, four or more diameters at the same time. Other tools are illustrated that combine operations such as turning and boring or drilling; turning, boring and facing; etc., which results in savings and increased production.

Gisholt standard tools are easy to set up. Many have micrometer screws, which make adjustments to close tolerances exceptionally easy. The vertical slide tool has a crank handle and screw with micrometer dial graduated in .001", permitting quick slide setting. Other

(Continued on Page 47)

TOMKINS JOHNSON

products...



the **RIVITOR**—for automatically feeding and setting solid rivets in automotive parts—clutch plates, seat racks, window frames; in cooking utensils—coffee pots, percolators, dripolators, shears, knives, can openers; in containers—oil and paint cans, garbage cans, cement pails; in sleds, skates, toys—production riveting of all kinds—obtaining a stronger joint, better—faster.

the **CLINCHOR**—for automatically feeding and setting clinch nuts in automotive body panel sections, door locks—and set as fast as the operator can feed the work to the machine. May be tooled for "D", "Case" or "Extruded" type clinch nuts. A Machine—not an attachment for a punch press—increasing production from three to five times—definitely minimizing spoilage.



T-J HYDRAULIC CYLINDERS are constructed to have a greater factor of safety insuring maximum service. They not only "look the part" they are capable of handling the toughest jobs. They are designed throughout to have not less than a factor of safety of 8 for pressures up to 1000 lbs. per square inch. The heads are steel. The tie rods and piston rod are alloy steel. Pistons of greater width provide better alignment. They are built for maximum service.

T-J AIR CYLINDERS function always to your advantage. You demand a unit to exert the right amount of power at the right speed. In addition to this you require that this power be applied repeatedly without failure in timing, without time out for adjustment, or replacements. You require a cylinder designed and built to successfully withstand fatigue, one that incorporates the use of packings that require no adjustment, one whose design throughout is controlled by features which count for service. The performance of these T-J Cylinders is gratifying even in exacting service.



Write for details to The TOMKINS-JOHNSON CO., 624 N. Mechanic Street, Jackson, Michigan, or get in touch with our representative in your territory. Boston—Gen. Mach. Corp. . . . Buffalo—R. C. Neal Co. Inc. . . . Chicago—H. F. Wolnick Mach. Co. . . . Cleveland—S. G. Morris . . . Denver—Edward C. Swan . . . Detroit—Haberkorn & Wood . . . Grand Rapids—Joseph Monahan . . . Hartford—Geo. M. Pearse, Jr. . . . Indianapolis—Henry G. Hoss . . . Milwaukee—J. M. Grimstad . . . Newark—George M. Pearse . . . Philadelphia—W. A. Rankin (Drexel Hill) . . . Pittsburgh—J. A. Bouslough . . . Rochester—R. C. Neal Co. Inc. . . . San Francisco—R. W. Conroy . . . Syracuse—R. C. Neal Co. Inc. . . . Canada—Geo. T. White Co. (Walkerville, Ont.) . . . Europe—Gaston E. Marbaix, Ltd., London, England.

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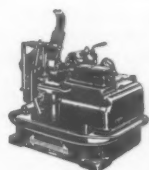
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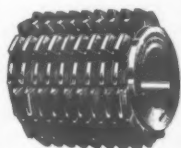
BARBER-COLMAN COMPANY

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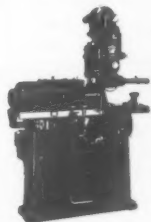
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HOBBS

B-C Ground Hobs for utmost in precision, production, finish, value. B-C Hobs with unground tooth-forms for less rigid requirements and lowest first cost.



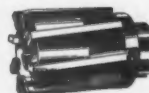
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Made in 2 sizes, both automatic. Grind accurately any make of straight- or helical-gashed hob which has radial tooth-faces equally spaced.



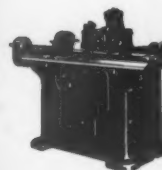
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For sharpening any make of Reamer, Hob, or Milling Cutter. New precision, new type sharpening, new economy. For all shops.



Reamers

Fluted and inserted-blade types. Latter have patented mounting. Both have B-C distinctive cutting edges, do unusually fine work.



**Reamer
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Machine**

Creates unique cutting edge and extreme accuracy. Re-creates these qualities in servicing B-C Reamers used in high-production work.

▼ ▼ ▼



MILLING TOOLS, CUTTERS

(Continued from Page 18)

steels, as well as steel castings.

Tungsten carbide is one of the hardest materials known and because of this is very brittle. In the first place it is quite expensive, and before using it promiscuously, someone who has had experience in its use should be consulted. When properly applied it will produce wonderful results, and will be well worth while. Rigid mounting and equipment that will stand high speeds is of vital importance.

Crobal is a non-ferrous high speed cutting alloy of tungsten, cobalt, chromium, and certain other elements. It is

the latter which imparts to crobal a cutting efficiency and long life exceeding that of other metals of a similar type. We have found that this material is very good on cast iron and malleable irons, and in some cases has increased tool efficiency from 15 to 35%. This metal is not recommended for use on milling steels, although there have been a few isolated cases where it has worked out very good. The steel jobs should be picked and engineered by someone familiar with the cutting metal and its application to steel.

The following approximate cutting angles are given in tabulated form for the different materials:

Material	Rake	Shear	Clearance
Alloy steel and			
cast iron	10°	10°	5°
Mild Steel	10°	10°	6°
Hard cast iron ...	0°	7°	5°
Aluminum	20°	20°	10°
Copper	25°	25°	10°
Lead and Babbitt.	45°	25°	15°
Brass	0°	0°	10°

Cast iron, bronze and steel should have a shear and rake angle of 10°. Copper and aluminum require sharper angles, while lead and babbitt require even more. Cast iron and brass it has been found will machine better without any rake angle.

Rake is the angle between the cutting edge and a radial line from the center of the cutter.

Clearance is the relief of the cutting edge back from the tangent line of cutter.

Shear angle is the angle the cutting edge makes with the axis of the cutter.

Chattering is one thing that is very detrimental to the life of milling cutters, and is caused by not having the proper rake or shear angles, or too much clearance, too light milling fixtures, cutter arbor too light, or general looseness in the machine. Sometimes this can be remedied by varying feeds and speeds.

Tables given here are intended only as a guide and should be used as such.



An important addition to the MICHIGAN line of crossed axis gear-finishers • Completely hydraulic and automatic in operation.

Rapid approach • Adjustable cutting feed • Adjustable hydraulic-cushioned rack reciprocation • Adjustable transverse head reciprocation • Automatic sizing of gear • Automatic stop for rack . . . Automatic fast return.

Designed for mass production of gears at the lowest possible tool cost • Modernly streamlined • Completely flexible . . . New 6-stage coolant filtering system for even finer finish and longer tool life • Massive construction.

Capacity: Diameter gears up to 8 inch.
Length between centers: 18½ in.

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DETROIT, MICHIGAN

Clip and Mail this Coupon for Catalog of "Michigan" Gear Finishing Equipment.

Name Title
Company Address

USING CARBIDE

(Continued from Page 20)

full speed before putting the tool to the cut. Put the tool below center not more than 0.010 inch for efficient cutting.

(6) Throw out the feed and let the cut run out before stopping the machine. Starting the machine with the tool against the work and the feed engaged, or stopping the machine with the tool in the cut, or stalling the machine will cause destruction of the tip.

(7) An indication of the destruction of the cutting edge of the tool is shown by dark red sparks (round fire) flying around the tip or the work. (When using HSS tools, an indication of the breaking down of the cutting edge is shown by a bright burned mark on the part being machined. Carbide tipped tools do not show this mark of deterioration.) Carbide tipped tools will stand much higher speeds and top pressures than will HSS or Stellite tools before breaking down.

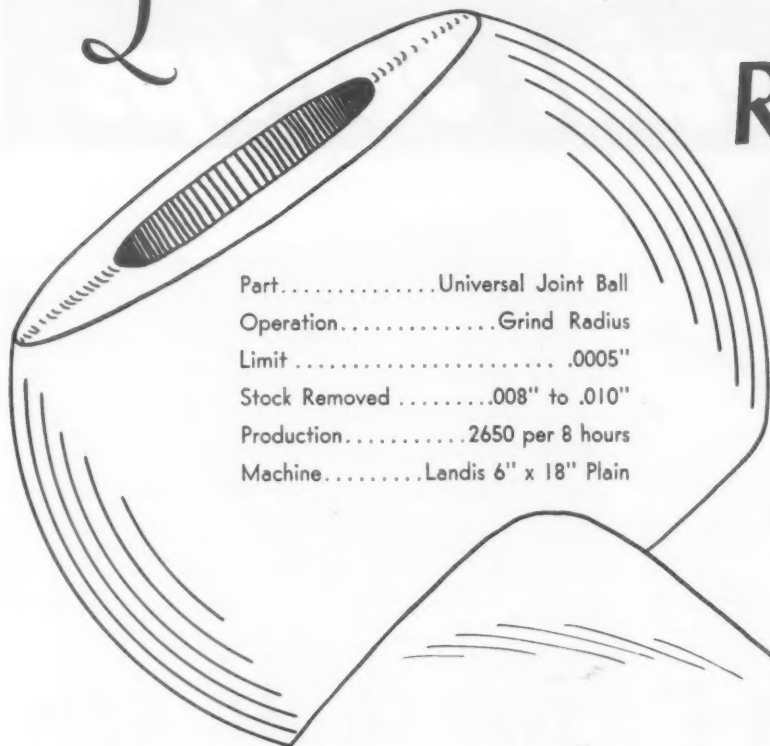
CHAPTER DOINGS

(Continued from Page 24)

"Industrial Mobilization." Colonel Waldmann spoke on "Manufacturing at the Rock Island Arsenal." Ford Lamb also spoke. Talks were specially interesting.

We have an interesting little news item from our Philadelphia Chapter this month. Seems as though they really do some exercising down in Philly. H. Cadwallader, Jr. recently completed a 600 mile hike starting at Philadelphia to Dansville, N.Y. about 300 miles then to the New York Worlds Fair. Caddy says, "I lost 17 lbs. feel 10 years younger and 20 years tougher."

Things ARE SHAPING UP RAPIDLY



Part.....Universal Joint Ball
Operation.....Grind Radius
Limit......0005"
Stock Removed......008" to .010"
Production.....2650 per 8 hours
Machine.....Landis 6" x 18" Plain

We show you here two interesting examples of radius grinding.

First, note the production. High, is it not? Then consider the fact that stock removal is rather large when the size of the parts is taken into account. And finally, the limits held are much closer than you might expect.

May we suggest that you check your grinding operations. Possibly some of your parts are not being shaped up as rapidly or as accurately as they could be on a modern Landis. 293



Part.....Centering Button
Operation.....Grind Radius
Limit......005" on diameter
Stock Removed......010" to .012"
Production.....4600 per 8 hours
Machine.....Landis 6" x 18" Plain

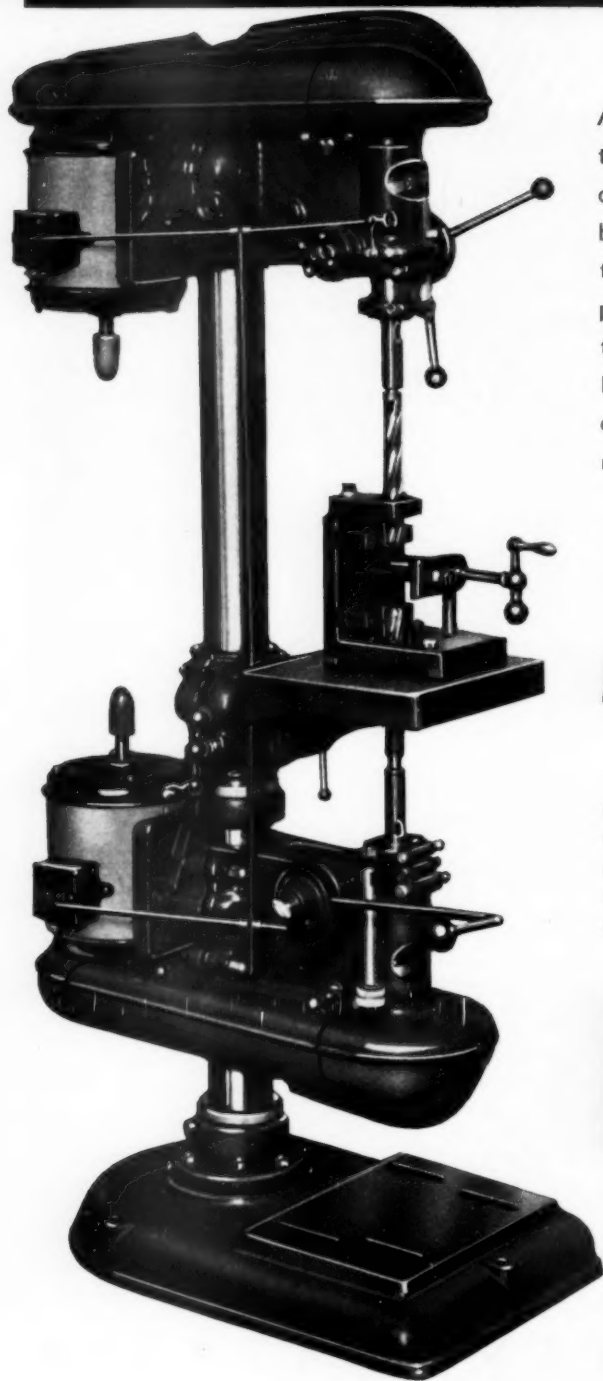


Invest in Landis

LANDIS TOOL COMPANY

WAYNESBORO, PENNSYLVANIA

The New Technique for Special Set-ups



Alert production men all over the country are utilizing this new method for building special set-ups at a fraction of former costs. Delta 14" and 17" Drill Press heads can be purchased separately—and assembled in any combination that best fits your needs. They can be used in any position—vertical, horizontal or at any angle—because their self-sealed ball bearing construction eliminates lubrication problems. Their low cost makes them more economical than anything that can be made up in tool rooms or machine shops. It will pay you to investigate.

Send for this NEW DRILL PRESS BOOK

Mail coupon for latest Delta Drill Press Book. It contains specifications and prices of complete line of Delta Drill Presses—plus details on individual parts from which you can make your own low-cost assemblies.



DELTA MFG. CO.
(INDUSTRIAL DIVISION)
630 E. VIENNA AVE.
MILWAUKEE, WISC.

Delta Mfg. Co. (Industrial Division)
630 E. Vienna Avenue
Milwaukee, Wisconsin

Gentlemen: Please send me a copy of your new 1939 Delta Drill Press Book.

Name

Address

City..... State.....



Cooperation!

Potter & Johnston are proud of the extent to which the United Aircraft Corporation employs their Automatic Chucking and Turning Machines for the successful manufacture of the famous Pratt & Whitney Wasp Engines and Hamilton Standard Propellers. One P & J feature, which is both valuable and important, is the practical cooperation offered to the customers' manufacturing engineers and executives—a tangible asset which accompanies every P & J Automatic

Your requests for sample production data and recommendations are invited.

**POTTER & JOHNSTON
MACHINE COMPANY**
Pawtucket, R. I.

FACTORY REPRESENTATIVES: William L. Martin, Headquarters at Factory: New England States and Eastern New York and New Jersey; A. W. Stone, 986 Kenyon Ave., Plainfield, N. J.; Western New York and New Jersey, Eastern Pennsylvania, Maryland and Delaware; G. Tell DuBois, 8-134 General Motors Building, Detroit, Michigan; Michigan and the City of Toledo, Ohio; Louis K. Voelk, 14014 Woodworth Road, East Cleveland, Ohio; Ohio—with the exception of Toledo, and Western Pennsylvania; Harry I. Schuster, 743 N. Fourth St., Milwaukee, Wisconsin; Illinois, Missouri, Wisconsin, Iowa and Indiana. **AGENCIES:** Star Machinery Company, 1741 First St., South Seattle, Washington; Henes-Morgan Machinery Co., 2026 Santa Fe Ave., Los Angeles, Calif.; Jenison Machinery Co., 20th and Tennessee Sts., San Francisco; Wessendorf, Nelms & Co., Inc., 3220 Franklin Ave., Houston, Tex.; Arthur Jackson Machine Tool Co., 60 Front St., West, Toronto 2, Ontario; Arthur Jackson Machine Tool Co., 437 Grosvenor Ave., Montreal, Canada; Burton Griffiths & Co., Ltd., Birmingham, England; R. S. Stokvis et Fils, Paris, France; Rotterdam, Holland and Brussels, Belgium; Maskinaktiebolaget Karlebo, Stockholm 1, Sweden; Ing. Ercole Vaghi, Milano, Italy; Yamatake & Co., Ltd., Tokyo, Japan; Imperial Export Co., 44 Whitehall St., New York, N. Y.; Almacoa, Zurich, Switzerland; Be-Te-Ha Warschau, Poland; Schuchardt et Schutte, Budapest, Hungary; Bourla Freres, Istanbul, Turkey.

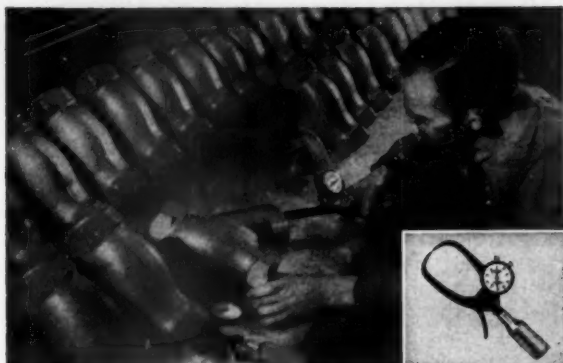
Honors for the Army
WITH A WASP-POWERED LOCKHEED



This year the Collier Trophy goes to the U.S. Army Air Corps for its brilliant work with the XC-36, first successful pressure cabin airplane in the world. Designed for subsonic operation under severe ranges of temperature and atmospheric conditions, this pioneering Lockheed is powered by dependable Pratt & Whitney Wasp engines.

PRATT & WHITNEY AIRCRAFT
One of the four divisions of
UNITED AIRCRAFT CORPORATION, EAST HARTFORD, CONNECTICUT





A Caliper Gauge That Reads Directly

Wall thickness of castings, bottles, stampings, plastics, etc., etc., are checked directly with this handy gauge. Also made with arms reversed for checking inside dimensions such as diameters, space between points, etc. It is so convenient to use you cannot afford to be without it.

Caliper arms can be furnished in different shapes and sizes to suit requirements.

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MULTI-UNIT DRILLER

UNIVERSAL AS A TURRET LATHE

Incorporates GOVRO-NELSON Automatic Units
Employing Centrifugal Force for
FAST, TOOL PROTECTING FEED
Send drawing for recommendations.

HOLE ENGINEERING SERVICE
307 THE BOULEVARD BLDG.
DETROIT, MICH.



Users of KENNAMETAL-tipped tools are finding profits in time saved in machining, annealing, tool grinding, and buffing on finished pieces. The reason: KENNAMETAL machines steel heat-treated up to 550 Brinell, at higher speeds, with more pieces per grind and producing a smoother, more accurate finish.

Begin today to earn extra dividends for your shop by using KENNAMETAL-tipped tools. Write for catalogue, also new Lathe Speed Chart and special Grinding Instructions.

Detroit Representative: Elwin M. Strickland,
2008 W. Grand Blvd., Detroit. Tyler 4-2975

STANDARD and SPECIAL TOOLS



McKENNA METALS Co.
600 LLOYD AVENUE
LATROBE, PENNSYLVANIA, U.S.A.

T. H. L. FRONT LEVER BENCH PUNCH



PRICE WITH ONE PUNCH AND ONE DIE—

\$37.00
Immediate Shipment

Built for hard, tough work—die cannot lose alignment with punch—all parts interchangeable.

Capacity— $\frac{1}{2}$ " holes through $\frac{3}{16}$ " steel; $\frac{13}{32}$ " through $\frac{1}{4}$ " steel. Can also be made for holes up to $\frac{7}{8}$ " in thinner metal. Stock punches and dies available from $\frac{1}{16}$ to $\frac{1}{2}$ " by 64ths.

Weight, 70 lbs.

T. H. LEWTHWAITE MACHINE CO.

(Est. 1890)

307 E. 47th St.

New York

A PROVING GROUND 74' x 53'

(MONARCH'S BOOTH AT THE CLEVELAND EXHIBIT)

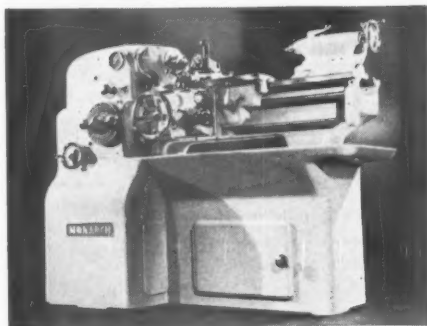
IT WILL BE A GREAT SHOW . . .
BUT DON'T WAIT UNTIL
OCTOBER . . . GET MONARCH'S
COST REDUCING FIGURES NOW!

MONARCH has one ultimate goal...continuously to improve its lathes so that each one will produce more and better work with less operator effort . . . so that each will make more money for the user. Monarch's enviable position in the lathe field proves that Monarch has achieved this goal.

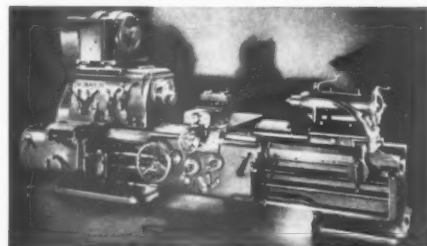
Monarch will not wait to "spring" a new line at the Cleveland show, because the Monarch policy calls for the presentation of new machines, new features, new methods—as they are developed. On its miniature proving ground, at Cleveland, Monarch will show substantially the same machines it is offering now. So don't wait. Every day you do without the Monarchs you will ultimately buy, you lose the extra profits these machines can make for you today.



SOME OF THE PROFIT-MAKING MACHINES MONARCH IS OFFERING



MONARCH 10" x 20" SENSITIVE
PRECISION LATHE



MONARCH MODEL N N ENGINE LATHE

MONARCH-KELLER CONTROLS

Monarch lathes, equipped with Monarch-Keller Controls, will reproduce contour shapes, inside and outside, to a tolerance of .001" or closer . . . from a thin master template. They do this in a fraction of the time required by ordinary methods. Production increases up to 500% are commonplace.

MONARCH AUTOMATIC SIZING CONTROLS

Any Monarch lathe equipped with these controls becomes an automatic machine and produces work much faster and more accurately than can be done by any other method. Many of these machines, now in use, are producing from two to five times the work turned out by a manually controlled lathe.

MONARCH Magna-Matic

This is regarded as today's most universal automatic lathe. Small lot production can now be put on an automatic basis with greatly lowered unit production cost.

THE MONARCH MACHINE TOOL CO. • Sidney, Ohio, U. S. A.

MONARCH LATHES
COVER THE TURNING FIELD



YOUR SMARTEST INVESTMENT TODAY—MODERN MACHINE TOOLS
MAKE MORE MONEY WITH MONARCHS

AGENCIES IN PRINCIPAL INDUSTRIAL CENTERS
THROUGHOUT THE WORLD

ADJUSTABLE **ADAPTER** ASSEMBLY

- Quick
- Accurate Adjustment



Furnished with an Acme or Standard V Thread ground on the outside diameter, furnishing a bearing on the front end of the adapter.

SCULLY-JONES & COMPANY

1905 South Rockwell St. • Chicago, Illinois

GAMMONS
OF
Manchester



PRODUCTION TOOLS

ORIGINATORS AND
MANUFACTURERS OF HELICAL
FLUTED TAPER PIN REAMERS

THE GAMMONS-HOLMAN CO., MANCHESTER, CONNECTICUT

ZIEGLER

ROLLER DRIVE

Floating Holder

FOR

**TAPS — REAMERS
COUNTERBORES
DIE-HEADS**



Compensates for spindle misalignment, eliminating oversized or bell-mouthed holes.

It is adaptable to all single and multiple spindle machines used for tapping and reaming. Shanks are furnished to fit all makes of machines and multiple spindle heads.

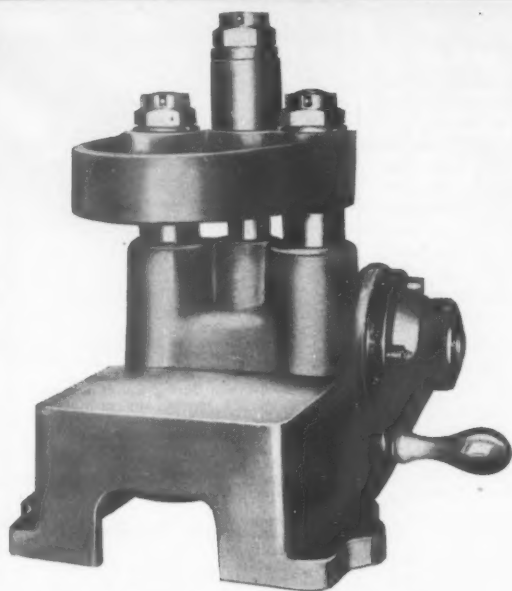
Much set-up time is wasted, many parts are scrapped, trying to produce uniform and accurately tapped and reamed holes on machines with spindles out of alignment with the work. Many taps are condemned for this reason and many holes are reamed bell-mouthed or oversize. A Ziegler Floating Tool Holder will eliminate these difficulties. A trial on your most difficult job will convince you.

WRITE FOR FULL INFORMATION

W. M. ZIEGLER TOOL COMPANY

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Detroit, Michigan



SWARTZ LS TYPE FIXTURE

A spring jig with solid clamping, as built only by Swartz. A heavy die spring prevents parts loosening if heavy drill pressures force the work lower into the adapters.

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SWARTZ TOOL PRODUCTS CO., INC.

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ASK FOR CATALOG 238

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Cleveland—J. W. Mull, Jr.
Indianapolis—J. W. Mull, Jr.
Milwaukee—Geo. M. Wolff, Inc.
Tulsa, Okla.—Brammer Machine
& Tool Service Co., Inc.

Represented by

Chicago—Ernie Johnson
Canada—Hi-Speed Tools, Ltd., Galt, Ont.
St. Louis—Mill Supply & Mach. Co.

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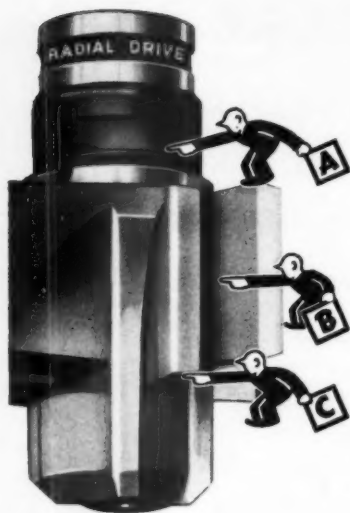
3 Reasons You Can Depend On Mac-its to Cut Costs

1. All standard diameters of socket screws are milled from solid bars of electric furnace steel, held to 5-point carbon range instead of the usual 10-point range.
2. Each Mac-it is heat-treated especially for the particular kind of service it will encounter.
3. Perpetual process testing at the machines, plus modern, laboratory testing equipment and practices, insure uniformity, durability, and fit.

You can use these qualities to cut costs on design, maintenance and production. Call your Mac-it distributor, or write for catalog and prices.

THE STRONG, CARLISLE & HAMMOND COMPANY
1392 West Third St., Cleveland · Ohio

WRITE FOR
CATALOG 35



ONLY THIS
ECLIPSE
MULTI-DIAMETER
CUTTER
OFFERS:

A Rugged
"Radial (on
center) Drive"
particularly designed to
handle the extra load of
heavy cuts!

B Each blade designed
with adequate chip clear-
ance!

C Separate blades provid-
ed for individual diameters
eliminating costly, awkward
undercuts and giving longer
sharpening life!

*Above features
assured by 25
years engineer-
ing experience!



DESIGN FOR CONVENIENCE

(Continued from Page 14)

of course, are dumb or just recalcitrant, but in a young man's game—which the production line is—there is plenty of intelligence; many of the boys go to night school studying to be Tool Engineers. Treated with consideration, which can be done without lowering barriers by those in authority, a considerable proportion of operators will respond, in many cases will advance worthwhile ideas. A wise designer will listen.

The writer recalls a woman machine operator who suggested an improvement that netted a saving of many thousands of dollars to the company employing her, while a sixteen year old boy, just out of his second year in high school, halved the cost of roughing out gear blanks. One instance stands out, in which a negro made a wooden model which was a marvel of ingenuity and highly complimentary to his craftsmanship, considering that the whole thing had been whittled out with a jack knife. He couldn't draw, but he could think—and did!—and needless to say his design (for such it was) was the very ultimate in operator convenience. One negro, a punch press operator in an eastern city, advanced an idea which was spurned by his superior, but, believing himself right, he started his own little shop out in the hen house, today runs a business that nets him a fair living. Were he white, he might be a prosperous manufacturer today. It all boils down to the fact that operators like convenience, and that convenience often means the difference between an average output and high production.

HANDY ANDY SAYS

(Continued from Page 26)

I stick to a conviction previously expressed, that this A.S.T.E. is one of the great forces in the evolution of brotherly love and civilization; we live, in our relations with one another, the very spirit of Americanism. As we grow in wisdom and strength, may we come to the conclusion that a federation of American engineering societies may be the prelude to a new and a finer order of things in this world. Let us shape it to our own high ideals.

Yours humbly,
HANDY ANDY.

California and Toronto Latest Chapters
to Be Chartered

Ford R. Lamb, Executive Secretary of The American Society of Tool Engineers, may become a champion Globetrotter. From Toronto, Canada, in late June to Los Angeles in middle July, with a possibility of a trip to the Argentine to charter chapters is really traveling.



The new Everede Boring Bar is the only bar on the market having the economical triangular bit. The design of this boring bar permits the use of a larger diameter than formerly used, due to having the bit cut in front, making room for the bar. This design spells rigidity, making higher boring speeds and heavier cuts possible.

The Everede Boring bars are made of the finest heat treated nickel steel; and each bar comes equipped with six high speed steel triangular bits. In addition, this is the only boring bar that allows the use of a solid Stellite or carbide tool bit. This is accomplished by clamping the bit on the "Y" type grip, which holds it firmly without danger of breakage.

Send for descriptive folder.

EVEREDE TOOL CO.

Willis Stutson

184 N. WACKER DRIVE, CHICAGO

Representatives in principal cities

PERSONAL

We hope You
have the
best vacation
of Your life

National Tool Salvage Co.
3816 Beaubien St.
DETROIT, MICH.

Columbia TOOL STEEL

Controlled tool steel
means **INSURED
TOOLS** — insured
for top performance,
life and service.

*It pays to use
Good Tool Steel.*

COLUMBIA TOOL STEEL COMPANY

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DIAMONDS FOR ALL INDUSTRIAL USES

*Watch your Diamond Point
SAFETY Line!*



DYKON Gage

shows when Diamond has worn
to *lowest* safety level and should
be returned for resetting.

Continued further use means abuse

*Let the DYKON Gage lengthen the
life of your diamonds*

This simple, positive protective
device is adapted for all Diamond
Tools and is an exclusive service
offered without charge to all
users of our Diamond Tools.

J. K. Smit & Sons, Inc.

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HARTFORD, CONNECTICUT

605 Law & Finance Bldg.
PITTSBURGH, PENNA.

DETROIT — CHICAGO — SEATTLE — TORONTO

*Maybe he's not
the dodo you
thought he was!*

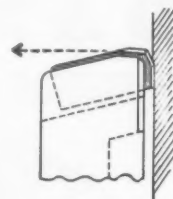


DON'T misjudge your competitor. He may not
be working for his health. He may have just
enough modern equipment to legitimately under-
bid you! "Friendly enemies," comparing the time
on lost jobs, often find that even slight modern-
ization can turn loss into profit. This is all too
frequent in the case of metal cutting tools—so,
to help solve the problem, we offer you

OK DUAL ADJUSTABLE MILLING CUTTERS

**Automatic Radial & Axial Adjustments
65% of Blade Usable**

Tapered, serrated blades fit into mating slots in the
cutter body. There they are held, without wedges,
pins or set screws, in an immovable grip, yet are
easily driven out from the rear. As the slots are on a
15° angle to the body, when the blades are set out one
or more serrations for regrinding, both radial and
axial adjustments occur at the same time. Increased
flexibility of use and length of blade life result from
this improved design.



FINISHING

These cutters are made in
a wide variety of sizes
and styles—for finishing,
as illustrated and detailed
here, and for roughing.

**SEND FOR
ILLUSTRATED
CIRCULAR**

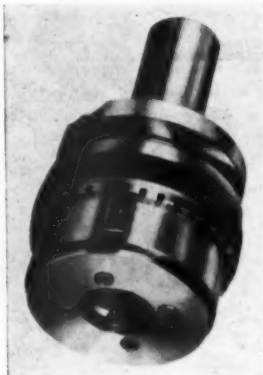
describing in engineering
detail the principle of the
O K Dual Adjustable
Cutters. Whether you are
modernizing now or not,
you should have this use-
ful circular in your files.

THE O K TOOL CO., SHELTON, CONNECTICUT



SYSTEM
OF INSERTED-BLADE METAL CUTTING TOOLS

Model C Revolving Type Die Head



Yoke controlled Tripping and
Closing

Accuracy — Reliability
Simplicity — Durability

Ask for Bulletin "C"

RICKERT-SHAFER CO.
ERIE, PA.

EMPLOYER, WHO?

(Continued from Page 28)

educational results.) That, in effect, would make the concern a cooperative, with the workers their own employers. We have read of cases where unions have loaned money to corporations rather than have them shut down, and certainly that presumes a deeper than average consideration of the employers' problems, which is such cases makes the running of a plant a mutual matter between the workers and management.

Recently, the workers in an Illinois foundry contributed \$165,000 rather than have the concern shut down and throw them out of work, and certainly those workers, now vitally interested

in the future prosperity of the foundry, may be considered their own employers, may be counted on to guard their own interests. It may, incidentally, be assumed that they will carefully watch the selection of the corporations future officers. Actually, the investment in time and labor, on the part of the average worker, is comparable to the actual ownership of stock, pays, on the whole, better dividends than earned by the stock. \$25,000 at 6% would only net \$1500 per year, with taxes reducing that. In the final analysis the public is the employer, where corporations are concerned; regarded in that light there is no particular class in industry. In a corporation, we're all employees.

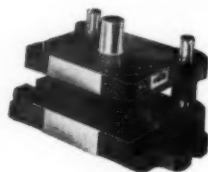
UNIVERSAL COLLET CHUCKS IDEAL FOR Single Purpose DRILLING



Universal Collet Chucks with ground threads hold drills with a firm, positive, concentric grip on either the shank or flute.

UNIVERSAL ENGINEERING CO.
FRANKENMUTH, MICHIGAN

DANLY PRECISION DIE SETS



Danly All-Steel Sets
Danly Commercial Sets
Danly Die Makers' Supplies

DANLY SERVICE

8 Danly Warehouses Provide
24-Hour Service for 85% of
All Metal Fabricating Plants

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DANLY DIE MAKERS'
SUPPLIES

SHELDON Back Geared PRECISION LATHES

No. 1136 WFCQ
with Headstock Motor Drive
Attachment
\$355.00 F.O.B. FACTORY
Here is today's best buy in
a 11" back geared, screw
cutting precision lathe. It's
a full weight quality tool
built throughout to industrial
standards with:
11" Swing, 36" between centers, 56"
hand scraped semi-steel bed with 2
V-ways and 2 flat ways. Large,
hardened steel spindle, and ground
all over. Hand Collet capacity 3/4".
Phosphorus Bronze Bearings.
Full Quick Change Gear Box.



The Sheldon Line provides quality 10", 11" and 12" lathes at moderate prices. Complete in drives, attachments, etc. See the Sheldon before you buy.

SHELDON MACHINE CO., Inc.
3515 North Kilbourn Ave. CHICAGO, U.S.A.

At Last!

A POSITIVE
ROLL GRIP
KEYLESS

DRILL CHUCK

that fills a
long-felt need

Check these
advantages:

- 1.—A chuck that will not let your drills slip.
- 2.—100% keyless.
- 3.—The heavier the load, the tighter it grips.
- 4.—No more drill shanks damaged by chucks.
- 5.—Yes! The tapered shanks are tempered.
- 6.—A slight twist of the wrist releases drill.
- 7.—Scientifically designed—ruggedly constructed.
- 8.—Will run true and remain so during its life.
- 9.—Unconditional one-year guarantee (barring abuse).

A folder giving prices and complete details will be mailed to you just for the asking.



MOTOR TOOL MFG. CO.
12281 Turner Avenue Detroit, Michigan

COMBINE OPERATIONS

Use a **NATCO** and Reduce Costs

Drilling
Hollowmilling
Chamfering
Counterboring
Facing



Located in one of the country's automotive transmission plants, this NATCO two-way trunnion type machine is performing a total of fourteen drilling, hollowmilling, chamfering, counterboring, and facing operations on 100 "transmission main shafts" per hour.

It is built of two NATCO HOLEUNITS complete with spindle boxes containing a total of 8 heavy duty spindles complete with nose adjustment. Mounted between the heads is a 5-position power indexed trunnion type fixture arranged to hold one part in each position.

This is another example of lowering production costs by combining operations on NATCO way-type machines . . . for they are designed for production work . . . and are sturdily built to stand up against hard usage over long periods with little maintenance expense.

Write for literature or call a NATCO representative to work with your engineers for a practical and economical solution of your machining problems.

THE NATIONAL AUTOMATIC TOOL CO.

Richmond, Indiana, U. S. A.

Chicago Office, 2009 Engineering Bldg.

Detroit Office, 409 New Center Bldg.

NATCO Advanced Engineering
Plus Quality Construction
Recognized For Many Years
The World Over

Investigate
NATCO Methods for
the Lowest Possible
Hole Costs!

NATCO
DRILLING, BORING and TAPPING MACHINES
SOLVES YOUR "HOLE" PROBLEM



Does It Take You HOURS or MINUTES To Fit Contours

In making your estimates do you have to allow for hours and hours of slow hand work when fitting irregular difficult contours, irregular shapes and uneven surfaces?

With BOYAR-SCHULTZ Grinders workmen can develop their skill to the fullest extent, doing in MINUTES, work that formerly took HOURS—and doing it BETTER.

BOYAR-SCHULTZ HEAVY DUTY GRINDER No. 2 with MULTIPURPOSE HEAD was designed and developed by Tool Engineers who are thoroughly familiar with the everyday problems of the tool and die maker. It is a smooth running Machine Tool that efficiently handles tool and

die work of larger and more difficult types. With it, heel or base punches can be ground in full view. All controls are located to operate conveniently from the front; large table tilts 10°; Ball bearing, 2 H. P. motor turns either spindle at approximately 10,000 R. P. M. with vertical oscillations of 100 per minute.

BOYAR-SCHULTZ PORTABLE GRINDER No. 1 is solving the contour grinding problems of hundreds of shops in this country and abroad. It is a TIMESAYER on smaller work for shops requiring grinding and fitting to close limits. Operates at approximately 20,000 R. P. M.

Write for Descriptive Literature

BOYAR-SCHULTZ CORPORATION

2116 Walnut Street

Chicago, Illinois

ACME

Standardized Drill Jig Bushings

Plain
Stationary
Press
Fit—
Type
"P"



Should-
ered
Stationary
Press
Fit—
Type
"S"



Remov-
able
Slip—
Type
"R"

Prompt delivery from stock on over 10,900 standard items—over 6700 ACME Standard—over 4200 A. S. A. Standard—all completely finished ready for use. Special sizes made to order.

Made in our new plant by the most exacting and scientific methods—insuring accurate fit plus long wear—concentric within .0003" full indicator reading.

Send for bulletin containing complete data and low prices. Satisfactory service guaranteed.

Also manufacturers of complete machine parts, specializing in hardened and ground parts requiring extremely close limits, lapped fits, etc.; also hydraulic appliances for pressures up to 20,000 lbs. per square inch.

ACME INDUSTRIAL CO. 208 N. LAFLIN ST. CHICAGO, ILL.

3 DAYS SAVED ON THIS DIE with 1 lb. of CERROMATRIX

By securing the punches in Cerromatrix, the American Automatic Devices Company, of Chicago, saved about three days in making this die.

Cerromatrix is a low-temperature-melting alloy that expands slightly on solidifying, holding punch and die parts tightly and accurately. It is used for long as well as short run dies of all types, including blanking, perforating, forming, lamination and other dies. It is also widely used for securing stationary parts in machines, without the costly procedure of making drive fits.



New applications are being found for this alloy from time to time. The chances are that it will save you money in your own department or shop.

Send for booklet

CERRO DE PASCO COPPER CORPORATION

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British Associates: MINING & CHEMICAL PRODUCTS LTD., London, England
Canadian Representatives: DOMINION MERCHANTS LTD., Montreal, Canada

ARMSTRONG



Modern cutting speeds
and modern accuracy
require

ARMSTRONG TOOL HOLDERS

Present day competition permits no delaying. Work must move to be profitable. Metal cutting must be fast, accurate and efficient and tool costs low. The surest way to meet present day requirements is to use ARMSTRONG TOOL HOLDERS for every operation on lathes, planers, slotters and shapers.

With ARMSTRONG TOOL HOLDERS you are permanently "tooled-up"—always ready for production work. You can step up cutting speeds and feeds safely for an ARMSTRONG TOOL HOLDER will stand up to any cut the machine tool can pull. You will do better machining for cutting angles, rakes and clearances are scientifically determined, are correct, and cutting tool costs are no longer a factor—each ARMSTRONG TOOL HOLDER will do the work of a complete set of forged tools and is capable of giving 10 or 20 years daily service.

Increase profits—end costly delays, small production machine hours, high tool costs and tool failures. Use ARMSTRONG TOOL HOLDERS wherever possible. You can pick them up as needed from stock at your local supply house.



ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

360 N. FRANCISCO AVE. CHICAGO, U.S.A.
New York Office: 199 Lafayette St., New York
San Francisco London

NEW LITERATURE

(Continued from Page 32)

tools with similar micrometer adjustments are a combination turning, boring and facing tool; a compound tool slide and a heavy duty slide tool adapted to hold stub boring bars for boring and facing, adjustable angle cutter holder and the single cutter bar turner.

Among various size and capacity chucks, are the Gisholt four jaw independent, three jaw scroll, and four jaw combination. Oversize chucks and air indexing fixtures can be designed to efficiently handle various types of work and are used in conjunction with standard tools and tool holders. A new collet chuck is also described which, through the simple substitution of various sized removable collet pads, can be made to accommodate various sized bar stock.

Drawings and photographs illustrate how these standard tools are applied to a large variety of work. They show how inexpensive standard tools may be applied to both small lot or quantity production.

These catalogs will assist you in selecting the most efficient turret lathe tooling for your work. Specific information on special tools is obtainable through the Gisholt Tool Engineering Division, which is well equipped to analyze your work and make recommendations for proper fixtures and tools that will increase production or lower your costs. Just state your problem. Write to Gisholt Machine Company, mentioning "The Tool Engineer," at Madison, Wisconsin.

• A convenient lathe chart which gives the recommended speeds for cutting steels of any range of hardness with Kennametal, the new carbide tool bit tip material, has just been issued by McKenna Metals Co., 189 Lloyd Ave., Latrobe, Pa. Cutting speeds recommended on the chart range from 20-30 surface ft. per min. for work of 65 Rockwell C (682 Brinell) to 300-400

Recommended Speeds in Cutting Steels
of any range of hardness with
KENNAMETAL
(The Steel Cutting Carbide Tool)

HARDNESS OF WORK			PREFERRED SPEED Surface Ft. Per Min.
Rock. C	Brinell	Relev.	
65	682	93	20 to 30
60	601	83	30 to 50
55	545	75	50 to 60
51	495	69	60 to 80
45	427	62	80 to 100
40	370	54	100 to 150
35	323	46	150 to 220
30	276	42	220 to 300
25	249	38	300 to 400

For Lower Hardnesses Use Any Speed Above 300

surface ft. per min. for work of 25 Rockwell C (249 Brinell). For work of lower hardness any speed above 250 surface ft. per min. is recommended. It will be noted that these speeds are from two to six times greater than those

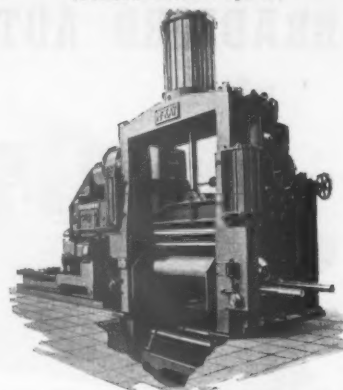
commonly used with high speed steel tools.

The chart also illustrates two designs for grinding tools so as to produce (1) crescent shaped chips, easily shoveled up, and (2) a coiled chip of tough steel. The reverse side illustrates the correct tool shape for interrupted cutting (jump cuts) with Kennametal tools; also the terms used in describing angles on single point cutting tools. Smaller rake angles are possible with Kennametal tools than with steel tools because Kennametal does not gall from the moving chips.

The October issue of "The Tool Engineer" will be mailed September 25. It will feature Machine Tool Show and A.S.T.E. Semi-Annual National Meeting.

NEW EQUIPMENT

(Continued from Page 17)



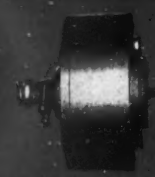
upon the material being firmly held on
(Continued on Page 49)

"LOGAN" Profit Making EQUIPMENT WILL BE DISPLAYED AT MACHINE TOOL SHOW

REMEMBER
CLEVELAND
OCTOBER
4-13

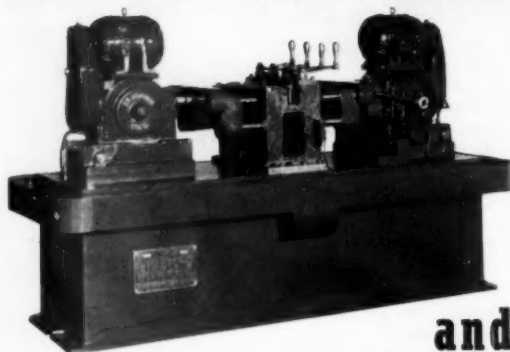
All equipment designed and manufactured by Logansport Machine, Incorporated has back of its design two main thoughts. First . . . How much time, how much effort, how much motion, how much money will this new piece of equipment save you, the buyer. Second . . . Will this piece of equipment give service through the years. The remarkable growth made by Logansport Machine, Incorporated through the past ten years is ample proof that this policy pleases you, the buyer. Many new designs have been perfected since the last Machine Tool Show and many other new designs are being perfected now. Visit Booth No. 3301 at the Machine Tool Show—See for yourself just what LOGAN has to offer you. See our line of American Standard Chucks, Air and Hydraulic Valves, Air and Hydraulic Cylinders, Air and Hydraulic Presses and Devices.

SEE "LOGAN" MACHINE DISPLAY BOOTH NO. 3301



LOGANSPORT MACHINE, INCORPORATED
502 Payson Road
Logansport, Indiana
Manufacturers of Air and Hydraulic Devices, Chucks, Cylinders, Valves, Presses and Accessories

BRADFORD AUTOMATIC



and SEMI-AUTOMATIC MACHINES

Shown above: A **BRADFORD** 2-unit, 8 spindle machine for drilling lock pin holes in automobile steering knuckle supports, 4 at a time. This machine, typical of thousands of Bradford units, made in sizes from 1/2 H.P. to 7 1/2 H.P., consists of two 4-spindle Bradford units and a cam type fixture mounted on a welded steel base having a built in coolant supply system and reservoir and electrical equipment. Operation: Drill 13/32" hole 1 1/4" deep in alloy steel forging. Production: 225 per hour.

WRITE FOR DESCRIPTIVE LITERATURE ON THIS
AND OTHER UNUSUAL BRADFORD EQUIPMENT

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Cincinnati (Established 1840) Ohio

Dealers wanted in some territories.

HANDEE TOOL OF 1001 USES

The first tool of its type and the leader today, with a reputation for unexcelled efficiency in over 300 different kinds of industry.

The Handee is a small "power house" that can be carried to any part of the plant—to repair some hard-to-get-at part on a machine without removing the part—to smooth off rough edges on dies and molds or to bore tiny holes in metals in the model and tool room—to clean delicate mechanisms in laboratory—for special jobs on the regular production line, etc.

De Luxe Model equipped with special custom-built motor develops 25,000 r.p.m. Weighs 12 oz. Air cooled. Grease-sealed ball bearings eliminate vibrations. 7-bar commutator. \$18.50 postpaid with 6 Accessories.

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Famed everywhere for great efficiency and long life. For use with Standard, De Luxe and Hi-Power Handees and other industrial equipment. Available in all sizes, in many grains and grades. Mounted on shanks to fit any type chuck.

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Information on all Handee Products, including largest assortment of accessories ever presented.



You'll be amazed at the seemingly impossible jobs it performs. Try it for 10 days in your own plant. If not satisfied, return for full credit.

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☐ Send Catalog Name.....
☐ Send De Luxe Handee on 10 Days Trial Address.....

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AND TROUBLE... BY
SPECIFYING NATIONAL
TWIST DRILLS, HOBS,
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CUTTERS, Special TOOLS



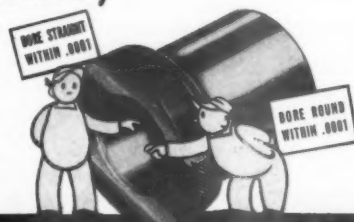
NATIONAL TWIST DRILL AND TOOL CO.

DETROIT, U. S. A.

Tap and Die Division, **WINTER BROS. CO.**, Wrentham, Mass.
Factory Branches: New York, Chicago, Philadelphia, Cleveland
Distributors in Principal Cities

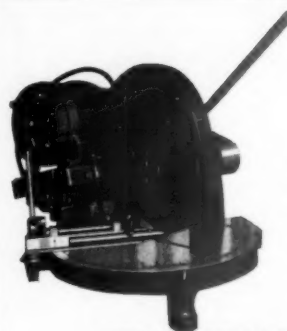
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Rigid standards of manufacture and Super-finishing of the bore insures the greater accuracy of Universal Drill Bushings—identified by the black dome.



UNIVERSAL ENGINEERING CO.

FRANKENMUTH MICHIGAN

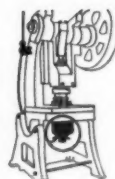


TANNEWITZ ABRASIVE CUT-OFF AND MITER MACHINE

For Bench Use

Instantly cuts any angle from 45° R. to 45° L., bars, tubing or moulding, obtaining a clean ground finish on hard or soft metal. Just the machine for the tool room. Saves Toolmaker's Time. Prices right. Six sizes. Send for Literature.

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Universal Die Cushions for deep drawing, forming die, pressure pad control, and blanking die stripper actions.

Write for engineering power press die booklet.

DAYTON ROGERS MFG. CO.

Minneapolis, Minn.

PRODUCTION PERSPECTIVES

(Continued from Page 19)

West

The newly formed **Northrop Aircraft, Inc.**, plans shortly to begin the manufacture of airplanes at Long Beach, Cal. Construction of a \$100,000 addition to the **Friden Calculating Machine Company** plant at **San Leandro, California**, started June 23, following ground-breaking ceremonies. The new project will virtually double the capacity of the plant. Its latest expansion program, one of the largest projects of its kind in **Metropolitan Oakland** in several months, was necessitated by a rapidly soaring volume of business, according to **Carl M. Friden**.

John E. Snowberger, veteran **Willys-Overland** employee for the past 19 years was appointed **Works Manager** with the **Toledo** plant by **Joseph W. Frazer**, President of the **Willys-Overland Motors, Inc.**

NEW EQUIPMENT

(Continued from Page 47)

a mandrel and drawn off under heavy tension. This job is controlled by the **Logan Heavy Duty Air Cylinders**, three of which are clearly visible.

The **McKay** uncoiler is the only machine of its kind on the market. Complete information regarding the machine can be secured from **The McKay Machine Company** at **Youngstown, Ohio** or from **Logansport Machine, Incorporated**, **Logansport, Indiana**.

Hanna-Air Cushion

"To meet the demand for a cushion which can be adjusted to meet the variables of air velocity, stroke and relation of cylinder capacity to load," **Hanna Engineering Works**, 1769 **Elston Avenue**, **Chicago, Illinois**, have developed an adjustable cushion for air cylinders. It is claimed that once adjusted, the cushioning is entirely automatic; as the cushion sleeve enters the cylinder head the air trapped between the piston and the cylinder head forms a cushion. Thereafter the speed at which the piston continues to the end of its stroke is controlled by an adjustable needle valve. Upon reversal of the piston travel it is essential that live air act immediately upon the full area of the piston. This is accomplished by a ball check valve without which the reversal of the piston stroke would be very slow; in fact, it is claimed, live air acting on only the cushion sleeve area might be insufficient to move the load.

Air Cylinders embodying this new development are available in diameters of 2" to 20" inclusive. Where heavy loads and long stroke are involved, modifications of the cushion provide greater cushioning area and stroke. In addition to the cushion control, such cylinders are equipped with speed boxes to control the full piston travel. Mention "The Tool Engineer" when writing for further information.

Tannewitz-Abrasive Cut-off and Miter Machine

The **Tannewitz Works**, **Grand Rapids, Michigan**, announces the type **M** Abra-

sive **Cut-off and Miter Machine** for bench use—which enables the tool maker to instantly make cuts of any angle up to 45 degrees left or 45 degrees right in steel or other metals instead of having to do the work by hand or power hacksaw. It is claimed that 98% of all the cutting off the tool maker has to do can be quickly accomplished on this machine, which is furnished for bench use with a one-H.P. or two-H.P. motor and has 10" or 12" diameter abrasive wheels or saw blades. Being made for bench use the machine, it is said, is modest in cost and readily portable.

Mention "The Tool Engineer" when writing for further details.

CELEBRATE ANNIVERSARY

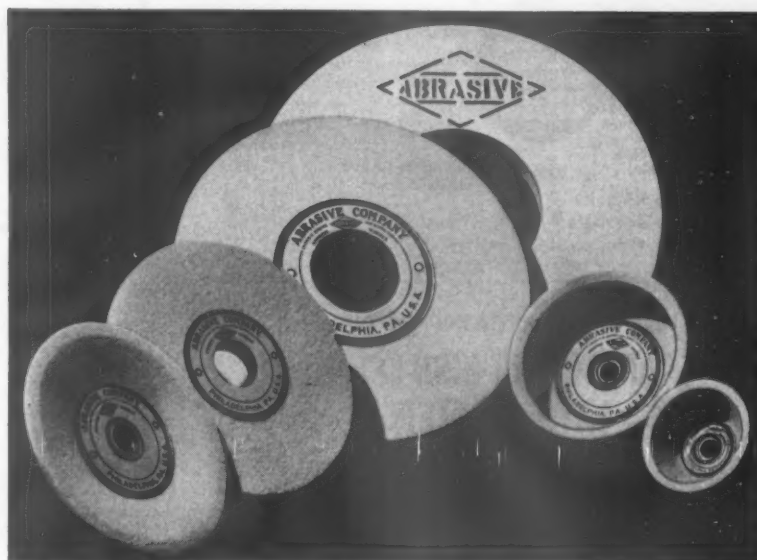
(Continued from Page 12)

and that industry might do well to raise another crop of this necessary evil.

After the meal we wondered who got out the story that a tool engineer can't

make a speech! Say, philosophy, poetry, humor, wisdom, and experience was expounded no end. The toastmaster, **F. G. Nagel**, enumerated the progress science has made since 1919 such as luxury air liners crossing the oceans, radio, television, new deal, etc.

The program called for swimming and golf. However, as the day was a typical early 1939 summer week end, cold, rainy and windy (the latter may have been an aftermath of the speeches) we confined our activities to indoor sports, and anti-Dickinson refreshments. The wives of some of the boys appeared later. While this was a good precaution it proved out that it was just good fellowship rather than a dire necessity, as most of us were able to wend our way homeward under our own power, a further proof of the superiority of the tool designers ilk! Everyone spent an enjoyable afternoon and evening and at the close of the meeting it was unanimously resolved to have another re-union in—1959.



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TRADE MARK

**TOOL ROOM
Grinding Wheels**

SIMONDS
Famous Family of
METAL CUTTING
TOOLS

ABRASIVE

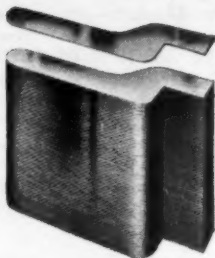
Cool . . . fast . . . free-cutting . . . on the hardest tool room steels and special alloys. Available in a wide range of grain and grades and bonds . . . including the popular "white" and "red" wheels . . . for every tool room grinding requirement. Specify **Abrasive Company SB Borolon** (special aluminum oxide) vitrified bonded wheels on your next tool room requisition and experience their exceptional performance on your work.

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Write for details.

ABRASIVE COMPANY
Division of **Simonds Saw and Steel Co.**
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75 FOLDING ARMS

MADE AT ONE TIME ON THE DoAll Peters Machine Co., Chicago, stacked 75 pieces of .083" high carbon steel, tack welded the corners to form a solid block more than 6" thick. A layout line was scribed on the top sheet and the 75 parts were made at the same time on the DoAll, in 4 hours, or about 3 minutes each. Labor cost, 3 cents each.



RECORD SMASHING

Contour Sawing, the new DoAll process of machining, is recognized as the fastest precision method of removing metal; cuts out internal and external shapes from any metal up to 10" thick.



FREE—New Hand Book on Contour Machining. 100 pages of valuable metal working helps.

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Does work of 3 machines. DoAll is a moderately priced, rugged precision machine tool that replaces shaping, milling and lathe work on a large variety of jobs with enormous savings.

Used in large and small plants in 30 countries by such firms as Ford, Fisher Body, Cadillac, Baldwin Locomotive, Douglas Aircraft, U. S. Navy, International Harvester, General Electric, Westinghouse, Ace Tool & Die, Glenn L. Martin, etc.

Let a factory-trained man bring a DoAll to your plant and show you what it does, what it saves on your own work.

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THESE CENTERS ARE GROUND AND HARDENED

Taper	Whole Length	Our Price Carbon	Our Price High Speed
1	3 5/16	\$.45	\$1.00
2	4 3/16	.55	1.75
3	5 1/4	.95	2.25
4	6 3/4	1.30	3.25
5	8 1/2	2.70	5.75



NEW DRILL SLEEVES WITH MORSE TAPER SHANK

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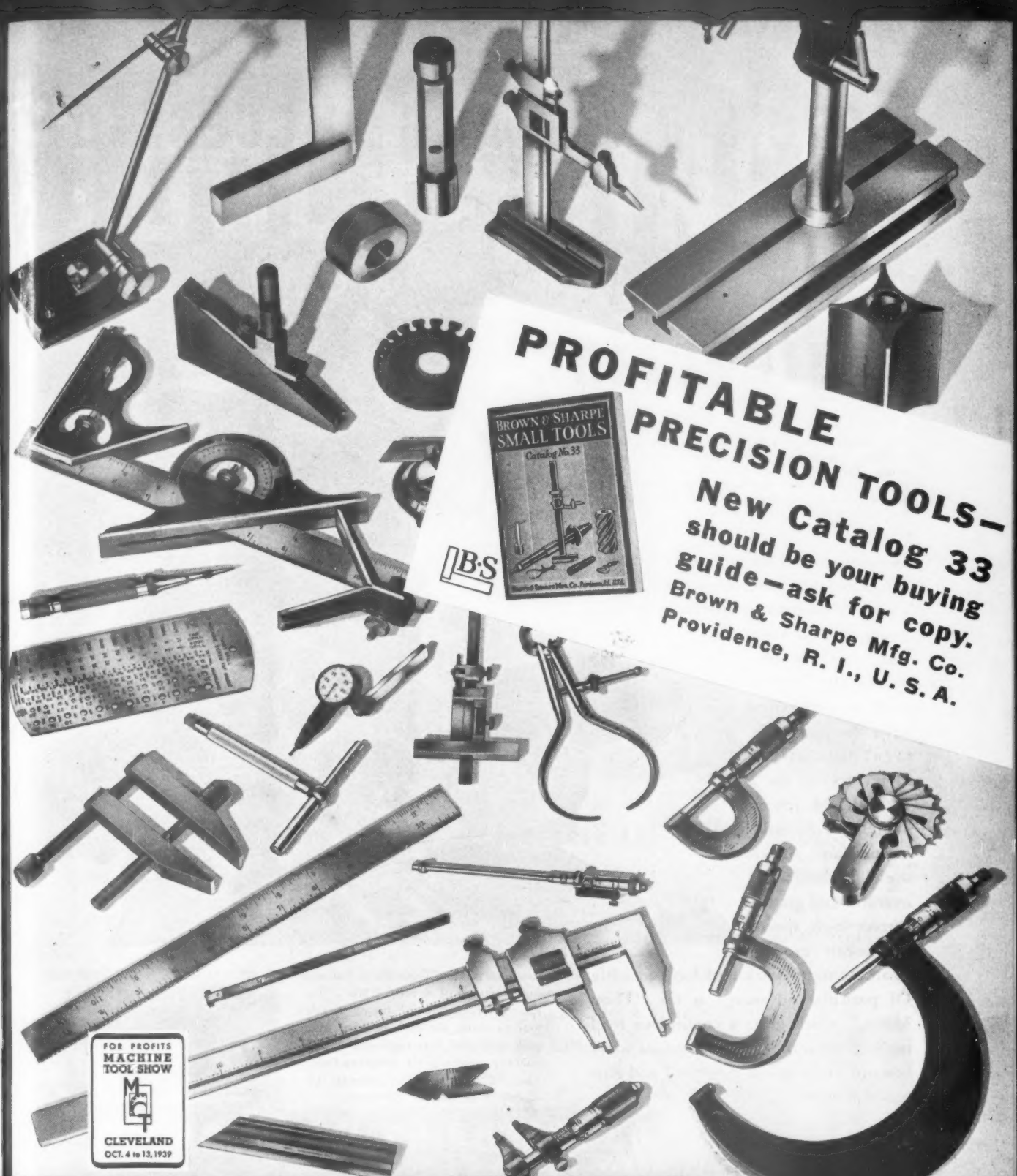
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guide—ask for copy.
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Providence, R. I., U. S. A.

FOR PROFITS
MACHINE
TOOL SHOW

CLEVELAND
OCT. 4 to 13, 1939

**BROWN & SHARPE
TOOLS**

Here's a Tip For Successful Tool Engineering

The Midgetmill swivels 360° in either direction, making it possible to do accurate work at any angle. Balanced design makes it safe in any position. Write for our new booklet describing in full the Midgetmill for boring, milling and drilling and the Speedmill for milling only.

Get the most from tool and machine—for successful tool engineering. The Dalrae Midgetmill is especially designed to get the most from small tools by providing the correct high speeds they need for most efficient operation. Don't try to do a 1200 R.P.M. job on a 400 R.P.M. milling machine. Attach the Midgetmill to the overarm and get the correct high speeds that mean smooth, clean, accurate work and long tool life. Of particular advantage is the "Thou-Meter," which gives a continuous reading in thousandths of the depth at which you are working—as described and illustrated at right.



Close-up of the "Thou-Meter," showing a setting of exactly 2.500". To use the "Thou-Meter," merely touch tool to work, set dial at zero, and mill, drill and bore until dial shows correct reading—in thousandths. The "Thou-Meter" is accurate to $\pm .00025$ " in its $2\frac{1}{2}$ " of travel.



DALRAE TOOLS CO., SYRACUSE, NEW YORK